the Iron Age
A Chilton Publication
THE NATIONAL METALWORKING WEEKLY • DECEMBER 1, 1955

How will AFL-CIO merger affect your business?
See page 62

Chromel-Alumel

THERMOCOUPLE ALLOYS

- **FOR ACCURACY!** Thermocouples made of Chromel-Alumel are unconditionally guaranteed to register true temperature-e.m.f. values within extremely close specified limits . . . ±4°F. from 0° to 530° F.; ±¾% at operating temperatures from 531° to 2300°F.

- **FOR DURABILITY!** Both Chromel and Alumel are highly resistant to oxidation, sensitive to temperature fluctuations. And they maintain their fine accuracy over a wider range of temperatures for far longer periods of time than any other base metal thermocouple materials known.

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Chromel-Alumel thermocouple alloys are produced exclusively by

HOSKINS MANUFACTURING COMPANY

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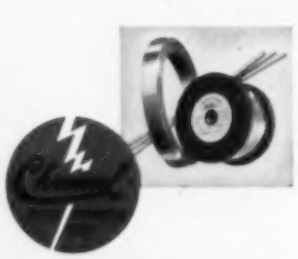
Ask for them by name!

Your instrument manufacturer or pyrometer service company can supply your immediate requirements . . . so specify them by name. "Chromel-Alumel" thermocouples . . . trade names you can trust!



Remember your first sled?

What bigger moment in a youngster's life than when he selects his first sled! Especially if it's a Flexible Flyer, the same kind Dad had, years ago.

Flexible Flyers, made by S. L. Allen Co., Inc., are widely known for quality—quality that starts with those slim steel runners, formed from hot-rolled carbon-steel T-sections. The ones shown here, which were rolled at our Johnstown, Pa., plant, measure 11/16 in. deep by 7/16 in. across, with a 1/16 in.-thick stem. And a slight concavity, or groove, is rolled into the cross bar. Grooved runners grip icy surfaces, preventing skids and giving better control.

S. L. Allen save money by using Bethlehem special sections for their sled runners. They avoid costly machining, forming and fabricating operations—and they get a better product, besides.

A few other typical applications illustrating the widespread uses of Bethlehem special sections are truck tire rims, door hinges, lawn-mower blades, fence posts, window sash, and typewriter-carriage rails. Perhaps you could cut production costs by using special sections, hot-rolled to your drawings and specifications. For complete information we suggest that you contact the Bethlehem office most convenient to you.

A workman at S. L. Allen's Philadelphia plant rivets hardwood bars to the sturdy steel frame.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

the Iron Age

DIGEST OF THE WEEK

Starred items are digested at the right

THE IRON AGE, published every Thursday, with an additional issue in June, by CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1933, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $6 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $35 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage," N. Y.

Address mail to Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

WHAT AFL-CIO MERGER MEANS TO YOU — P. 62
A unified labor movement will pose some problems for business men in the years ahead. What these problems will be may not be apparent immediately. But it goes without saying that greater union pressure will be exerted on business and government in the drive to achieve labor's aims. Union personalities important.

WHAT WALL ST. THINKS OF STEEL STOCKS—P. 64
Bulls show new interest in steel stocks. Good earnings of recent years will improve with increased production from scheduled expansion. Cash flow picks up and steel pricing policies are now aimed at improving earnings to attract more risk capital. Confidence in continued strong demand for steel prompts Wall St. to show new interest in steel investments.

INVENTORIES ARE RUNNING BELOW SALES — P. 66
Latest Government report on inventories is cheering. Stocks on hand are running well below sales and industry apparently is having a struggle increasing them. This reverses a situation earlier in the year when there was a slight increase. Metal fabricators were among the last to increase inventories.

IRON ORE SUPPLY WILL LAST THROUGH WINTER—P. 68
Second best peacetime shipping season guarantees adequate stocks despite record steel production. But price increases estimated as high as $2 per ton are in line for 1956. Hot demand for high quality foreign ores results in price increases and possible gray market activity. Imports continue to climb.

WHERE WILL WE GO FOR WARTIME MINERALS?—P. 69
Transportation of stategic minerals in time of war is the subject of study and debate in Washington. Funds will be spent to strengthen our lifelines. Question is how. One side wants U. S. shipping pushed. Others say we should concentrate on roads to Alaska and Latin America.

AUTOMAKERS' SEARCH FOR TECHNICIANS — P. 76
One of Detroit's biggest problems is obtaining good supply of engineers and skilled technicians. Finding and training service mechanics gets top consideration among automotive personnel problems. GM, Ford and Chrysler all provide advanced education for engineers.

IN METALWORKING

ENGINEERING & PRODUCTION

MECHANIZED HEAT TREATING — A TREND — P. 99
Fully mechanized heat treating departments are a novelty no more. Industry finds them the logical addition to complete shop automation for maximum efficiency. No one system is universal. Often some ingenuity is called for. Most floor arrangements can be adapted to an integrated or dispersed pattern.

NEW CHROME FINISH CUTS PARTS HANDLING—P. 103
A low-cost, low investment chromium plating bath has answered the need for getting into production fast with a new line of builders' hardware. The Crack-Free process deposits chrome directly on zinc diecast parts without requiring a copper and nickel undercoating. The method provides a good finish, reduces part handling and avoids difficulties involved in chrome-plating zinc diecastings.

ENGINE TRENDS TEST INVESTMENT CASTERS — P. 106
Parts for aircraft jet engines are getting bigger and more complex. And the future of the gas turbine for cars depends on large measure on low-cost, heat-resistant cast alloys. Both these problems were tossed at the investment casting industry recently. Despite progress in this casting technique, demand is for more and faster headway to keep pace with design trends.

COLD ROLLING FORMS SPLINES FASTER — P. 108
Cold rolling steel parts to final dimensions has established itself as a high-speed method for producing splined shafts to finish tolerances at low cost. Using the rack-forming method, Ford has splined more than 2-million axle shafts in less than 200 working days.

PROPER RINSING CURBS PINPOINT CORROSION—P. 110
Pinpoint corrosion has plagued the steel industry. Investigation now shows that rust of this type can be influenced by rinse water composition. In rinsing, the defect can be reproduced by using low concentration of alkali plus certain anions, the worst being chloride.

MARKETS & PRICES

BOOMING TOY INDUSTRY HAS ITS PROBLEMS—P. 59
Retail sales of toys will go over the billion dollar mark this year. Manufacturers estimate sales are up 16 to 20 pct and metal toys lead the way. But the industry relies heavily on Christmas for sales volume. This means manufacturing and shipping must be geared to a two-month season. Situation creates tough financial and employment problems. Diversification and job work have eased these headaches for some.

PURCHASERS FIND STEEL CUPBOARDS BARE—P. 67
Steel inventories approach the critical point. Most industries face slowdowns, many are forced to reject business. First quarter quotas find purchases up against one of the worst shortage periods in years. Conversion deals and warehouse purchases keep many metalworkers from having to halt operations.

CANADA ENJOYS OLD FASHIONED BOOM — P. 81
Canada looks good on both domestic and export fronts. Automotive production is up 21 pct. Textiles, appliances and electric equipment all share in the boom. And prosperity is on solid ground. Raw materials, not synthetic aids, back the Dominion's growth.

MACHINE TOOL SHOW BEGINS TO PAY OFF—P. 87
Big October jump in machine tool new orders is attributed to Chicago show. Shipments are up too but backlogs continue to grow. Builders could step up production, which is below capacity, but cost would be high. For this reason, an all-out push in unlikely.

WHAT ABOUT STEEL FOR STEEL EXPANSION?—P. 155
Steel producers find themselves in the uncomfortable position of competing for the steel they need for expansion. This results in trading deals with competitive mills. So producers are in somewhat the same spot as their customers. And some consumers are taking their troubles to Washington, adding to mill woes.

NEXT WEEK:

HOW TO CHOOSE THE RIGHT BROACHING FIXTURE
Modern broaching practice makes use of a variety of work-holding fixtures. Best choice hinges on the part itself, production required, possible before-or-after machining. Rotary-table indexing fixtures, shuttle types, trunnion devices—they're all good in the right places. Here's a rundown of most-used designs.

WHAT'S THE OUTLOOK FOR MACHINE TOOLS?
Machine tool builders did a good selling job at the Chicago show. Orders have jumped. Next week's report discusses the sales climb and tells what this will mean to the prospective buyer of machine tools. Orders, shipments, production and backlogs are covered from the standpoint of buyer and seller.

Christmas Greetings

TO OUR FRIENDS IN THE METAL FINISHING INDUSTRY
from THE STEVENS TEAM


W. J. Cluff
Detroit, Mich.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Detroit, Mich.


F. Watt
Detroit, Mich.


G. A. Cummings
Detroit, Mich.


D. Swaninger
Detroit, Mich.


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Detroit, Mich.


J. Barton
Detroit, Mich.


J. D. Johnson
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Detroit, Mich.


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Springfield, Ohio


C. J. Menzemer
Buffalo, N. Y.


L. H. Tressler
Buffalo, N. Y.


H. Faint
Chicago, Ill.


G. D. Stevenson
Cleveland, Ohio


H. M. Brown
Dayton, Ohio


B. Jacoby
Dayton, Ohio


L. Singer
Detroit, Mich.


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Geneva, N. Y.


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Hamilton, Ohio


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R. Hoff
Jackson, Mich.


T. R. Williams
Mansfield, Ohio


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New Haven, Conn.


E. King
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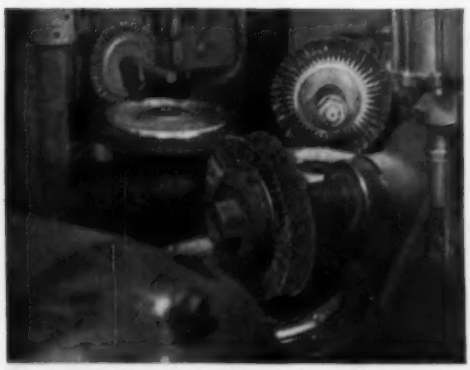
W. Rolak
Detroit, Mich.

FREDERIC B. STEVENS
INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

BEFORE BURR REMOVAL

AFTER BURR REMOVAL

Removing burrs for trouble-free transmissions



One of many automatic brushing setups used by automotive manufacturers to finish transmission parts and other components.

BURRS left on automatic transmission parts can break loose in service, clog hydraulic lines and cause serious damage.

The two sections of a transmission cover shown above prove how thoroughly power brushing removes burrs and blends surface junctures . . . leaves the part smooth and clean.

Have an **O**sborn **B**rushing **A**nalysis made of your operations. It costs you nothing, but may save thousands of dollars in your finishing of parts. Write *The Osborn Manufacturing Company, Department F-39, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

Editorial:

The Cold War Never Was Off

◆ WHEN SOME PEOPLE take a strong and particularly vocal stand against the Communists there are those who accuse them of not wanting peace. Nothing could be further from the truth. It should be clear now that strong language, strong defense and intelligent diplomacy are the only messages the Russians understand.

It should be known to many of our peace advocates that cooperating too much with the Reds might bring on war. It may be news to some people that the Communists take many of our sincere actions as a sign that they can go ahead and grab what they want.

Talk and hindsight can't eliminate a deep feeling of frustration over the recent Geneva meeting of foreign ministers. Not only was it a failure for us but it was a net loss. True, we and our allies are closer together. But we should be close to each other without a Geneva "meeting."

Valuable time has been lost on the diplomatic front. We are not as solid in the Far East and in the Middle East as once we were. In that area the Russians have been successful in lying and promising anything but what they can deliver. They are making hay with their attempts to sow seeds of distrust and suspicion.

What does this mean to you as a businessman? It means that again you must face the cold hard fact that there will be no peace—as you understand peace—in your lifetime; only a cold war.

Talk out of Washington that our defense spending or preparations will be unaffected by the Geneva failure is wishful thinking. Of course our defenses will have to be strengthened. And it won't be because our economy is bigger. It will be because we cannot take the terrible chance of being unprepared if the Reds move in on the free world without warning.

In every field the Communists are becoming stronger: armed forces; heavy industry; steel production; propaganda; arrogant and brutal diplomacy. In things of the spirit we should be the strongest. But until freedom means as much to us as living, we will not match the Communists' fervor for world domination.

The cold war never reached a cease-fire let alone a truce, much less an end. It will not end until Russia and other Communist countries are stopped in their tracks. To believe this can be done by kindness and turning the other cheek is to duck the facts.

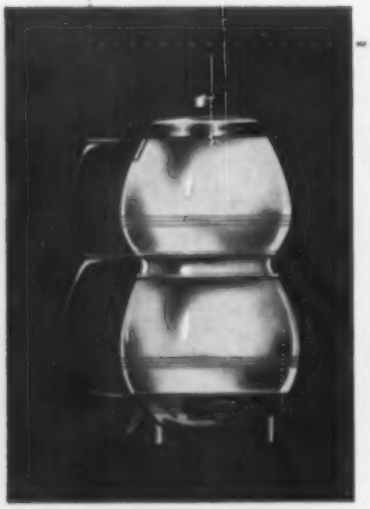
Tom Campbell

EDITOR-IN-CHIEF

for products that must have

Eye appeal...

HERE'S THE STAINLESS WITH THE FINISH . . .



SHARON STAINLESS STEELS

A special patented steel finishing process, developed by Sharon metallurgists gives to Sharon Stainless Steels a "buffability" unmatched in the industry. Those who have compared stainless finishes after buffing know, that when it comes to finish, Sharon Stainless has no equal.

So, if you're thinking of product improvement and considering the use of Stainless Steels why not get the finest . . . . specify Sharon Stainless Steels. Technical information and fabrication help upon request.

There are Sharon offices located in Chicago, Cincinnati, Cleveland, Dayton, Detroit, Indianapolis, Milwaukee, New York, Philadelphia, Rochester, Los Angeles, San Francisco, Montreal and Toronto to better serve your needs.

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Sharon has prepared a fact-packed, fully illustrated booklet with up-to-the-minute information about 430 Stainless Steel. To get your free copy contact your nearest Sharon representative or write direct to **Sharon Steel Corporation – Sharon, Pa.**

SHARONSTEEL

1A 12155

dear editor:

letters from readers

West Coast Report

Sir:

I have been a reader of THE IRON AGE, boy and man, for quite a spell and want to comment on West Coast Report compiled by your Mr. R. Raymond Kay.

Mr. Kay seems to summarize with admirable conciseness the whole picture and advance news about metals, aircraft and automotive operations in the expanding Far West into space that is reminiscent of the limerick about limericks:

A limerick packs laughs anatomical
Into space that is quite economical
But the good ones I've seen
So seldom are clean
And the clean ones so seldom are comical!

Kay doesn't run rhymes or humor but he certainly packs the facts into a few well chosen words. Continued success to a fine publication which seems to get even better each year. *A. S., Los Angeles.*

Preacher-Layout Man

Sir:

I was extremely interested in an article you published in your October 27th issue on religion in industry and would like, if possible, a copy of the proceedings of that series of meetings. If this is permissible, could you forward me a copy of the same? I would appreciate it.

I am preaching at a small church now and have been keeping my job as a metal layout man along with it, so I am doubly interested in how religion may be emphasized in all industry. *Rev. Calvin E. Eastwood, 510 Trevor St., Brownsburg, Indiana.*

The proceedings will be published in book form about January 15, 1956. You may secure a copy for $3.00 by writing: Albany Diocesan Bookstore, 68 South Swan St., Albany 10, N. Y.—Ed.

Induction Heating

Sir:

I would appreciate your sending me at your earliest convenience three copies of the special feature article "Induction Heating" which appeared in your November 10th issue. *T. L. Holmes, Supt. Elec. Prod. Dept., The M. W. Kellogg Co., Jersey City.*

Sir:

We would appreciate two reprints of your article "Induction Heating." An excellent article! *A. C. Strother, Chief Draftsman, The Terry Steam Turbine Co., Hartford.*

Sir:

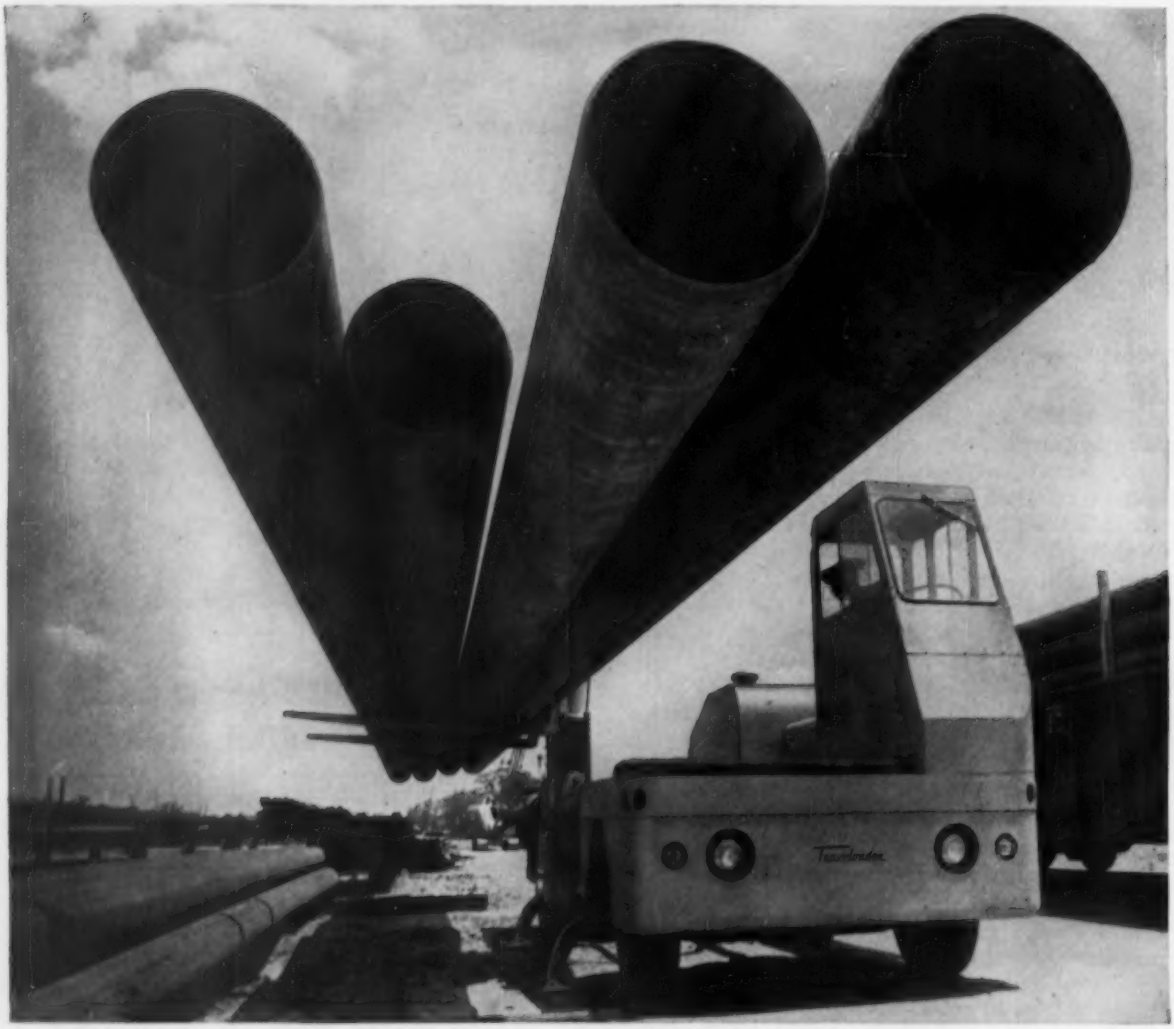
We have read your article, "Induction Heating" in the November 10th issue and would like you to send us three (3) copies of this feature. *C. M. Cosman, Metallurgical Engineer, Vanadium Corp. of America, Graybar Building, 420 Lexington Ave., New York.*

Steel $

Sir:

Most of the purchasing people you interviewed in Pittsburgh have read your article, "How to Get More for Your Steel Dollar." They think it is an excellent reporting job and ask that I convey their felicitations. To my way of thinking, it's a fine job of reporting and writing, and I'm confident it will be useful to a great many people in Purchasing. In fact, if I could get 25 to 30 copies of it I'd send one to each of our steel buyers. *H. C. McDaniel, Manager Technical Information, Westinghouse Electric Corp., Pittsburgh.*

You can still obtain copies—Ed.



Traveloader... revolutionizes long load handling!

Here at last is a practical answer to the awkward problems of yard handling and particularly those nightmarish long loads. Traveloader combines the unique ability to pick up, carry and stack long, unwieldy or multiple pallet loads —indoors or out. Operating over paved or unpaved roadways, it does the job fast, safely, and much cheaper than other equipment.

This one machine, with one operator, replaces two and often three fork trucks, portable cranes or straddle carriers, and does the job better. You save manpower, cost of buying and maintaining other expensive equipment, aisle space, and time. Because Traveloader loads from the side and carries loads lengthwise, it requires much less aisle space than fork trucks.

Unlike a straddle carrier, this new machine can stack up to 12 feet high. And when traveling, the load is nested safely aboard the Traveloader's deck, eliminating dangerous dangling and swaying of load, distributing load evenly over four large wheels, and making speeds up to 30 MPH practical and safe.

Write for descriptive bulletin No. 1360.

ONLY TRAVELOADER

Picks up like a *straddle* truck • Delivers like a *highway* truck • Stacks like a *fork* truck

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A subsidiary of Otis Elevator Company

5T4

fatigue cracks

by William M. Coffey

This Is It

On a recent infrequent tour of the editorial dept. we ran into the managing editor. We try pretty hard not to run into managing editors because they generally try to put to work any man within reach. But this was unavoidable. We tried to brush past him with our usual hangdog look, but he grabs us and says, "Jim, what are you doing for it"? (He's called us either Jim or George for years which is very good for us because it indicates that he doesn't really know what we are or what we do and just how we fit into his scheme of things which is a fine arrangement because we figure if he doesn't quite place us he doesn't know just how far he can go with this work business.)

"It?," we mumble.

"Blank, George, you mean you aren't doing anything for it? Blank, Blank," he says.

"Oh, you mean **it?**"

"You're blank blank blank I mean **it.**"

"Well, we're doing plenty for it. Plenty."

"Let me see some of it."

So we went back to the third floor and plagiarized the following:

"The heads-up, look-ahead attitude is vital in a fast-moving market like metalworking . . . but that's only half the picture! Today's executives . . . in administration, production, engineering, purchasing . . . want a 2-way look—backwards and forward — before they shape their plans, policies and decisions. And that's exactly what you'll get in the 101st Annual Review and Forecast Issue of THE IRON AGE to be published January 5, 1956."

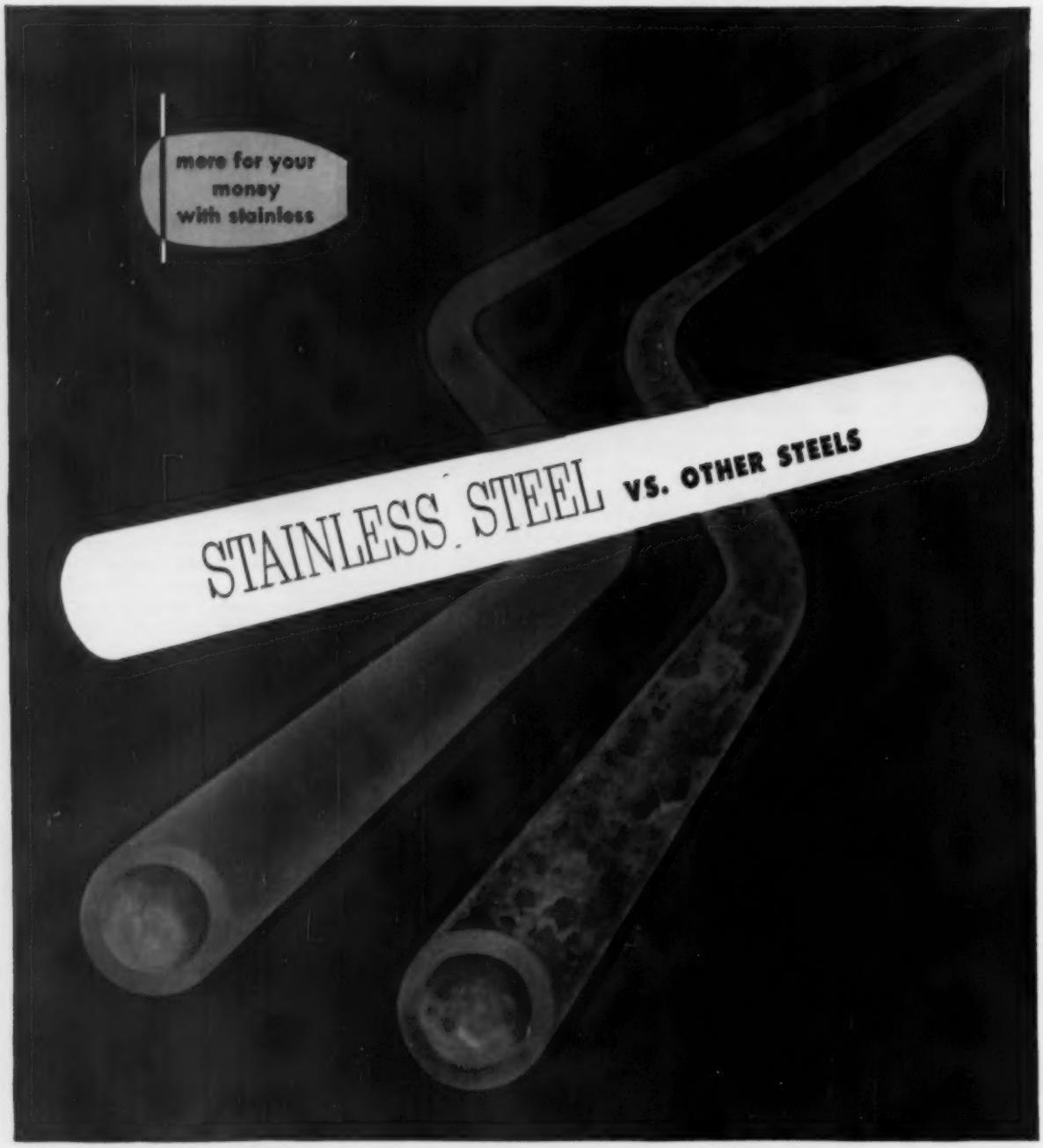
The look backwards will answer such questions as these: What's been happening to labor over the past four quarters . . . how fast has atomic energy and automatic control come along . . . what's been the effect of government on business and industry . . . how did steel make out last year . . . what new technologies were born . . . how did the tool-makers fare?

And **the look forward** will answer questions like these: Which way is the guaranteed wage heading . . . what are the areas where atomic energy and automation will make greatest inroads . . . how about chances for tax relief . . . what are the chances for steel in '56? Copper? Nickel? . . . Will there be much retooling among the automakers . . . what new techniques and processes should metalworking management watch for . . . will equipment sales go up or down . . . what are the prospects, field by field, across the whole wide range of metalworking . . . will you make more money next year?"

Well, that's **it.** But not all of it by any means. This Annual will be an Annual to remember. You'll use it like an encyclopedia—refer to it over and over in the coming year for useful information, dope and data.

Puzzlers

The minimum cost for connecting the 9 pieces of chain into one piece (Oct. 27 puzzler) is 24¢. Winners: Jim Mull, Jr., The North American Manufacturing Co.; L. B. Kramer, Wetherill Engineering Co.; Roy Weckerly; Leo and Smokey, who telegraphed "make them tougher"; Joe Brugman; Nels Johnson, Wireryte, Inc.; George W. Watt, Aluminum Co. of America; I. M. Darcey; Donald F. Stonehurnor, Oak Ridge National Laboratory; Letterman and Berry of the General Steel Bunch (Charlsie tried too hard); Carl Langenberg, Oldsmobile Div.; Elmer Thompson, Philco Corp.; and C. W. McKinley.



Regardless of present conditions it is often difficult to predict future operating requirements. A generous safety factor should be allowed for all possible conditions of corrosion, oxidation, pressures and temperatures. In the range of B&W stainless steels will be found the answers to virtually all of these conditions. It's easy to anticipate substantial savings in downtime and labor costs in replacing worn-out tubing made from less hardy metals. Be sure with B&W stainless.

Get in touch with Mr. Tubes, your link to B&W, for the story of how you can get more for your money with stainless tubing. *Or write for Bulletin TB 1.1A.*

B&W
TUBULAR PRODUCTS DIVISION

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General Offices: Beaver Falls, Pennsylvania
Plants: Beaver Falls, Pa.; Alliance, Ohio; Milwaukee, Wis.
Seamless and Welded Tubing and Pipe, Seamless Welding Fittings and Flanges—in Carbon, Alloy and Stainless Steels

TA-5035(P)

dates to remember

DECEMBER

SOCIETY FOR APPLIED SPECTROSCOPY—Regular meeting, Dec. 6, Hotel New Yorker, New York City. Society headquarters, Johns-Manville Research Center, Manville, N. J.

AIME—13th annual electric furnace conference, Dec. 7-9, William Penn Hotel, Pittsburgh. Society headquarters, 29 West 39th St., New York.

THE MATERIAL HANDLING INSTITUTE—Annual meeting, Dec. 12 & 13, Statler Hotel, New York City. Society headquarters, 813 Clark Bldg., Pittsburgh.

EXPOSITIONS

1955

25TH EXPOSITION OF CHEMICAL INDUSTRIES—Dec. 5-9, Commercial Museum & Convention Hall, Philadelphia. Society headquarters, 480 Lexington Ave., New York.

1956

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

JANUARY

INSTITUTE OF SCRAP IRON & STEEL, INC.—Annual convention, Jan. 3-6, Hotel Sherman, Chicago. Society headquarters, 1729 H St., N.W., Washington, D. C.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC.—Annual meeting, Jan. 9-13, The Sheraton-Cadillac Hotel and Hotel Statler, Detroit. Society headquarters, 29 W. 39th St., New York.

AMERICAN ROAD BUILDERS' ASSN.—54th annual convention, Jan. 11-14, Miami Beach, Fla. Assn. headquarters, World Center Bldg., Wash. 6, D. C.

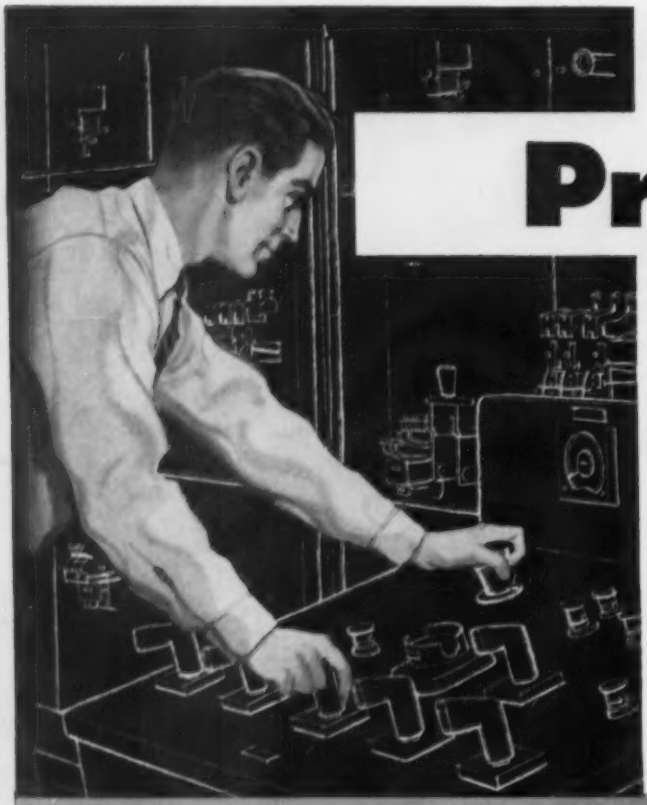
STEEL SHIPPING CONTAINER INSTITUTE, INC.—Winter meeting, Jan. 18-19, Hampshire House, New York City. Society headquarters, 600 Fifth Ave., New York City.

COMPRESSED GAS ASSN., INC.—Annual meeting, Jan. 23-24, The Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

INDUSTRIAL HEATING EQUIPMENT ASSN., INC.—Annual meeting, Jan. 23-24, LaSalle Hotel, Chicago. Assn. headquarters, 155 E. 44th St., New York.

TRUCK-TRAILER MANUFACTURERS ASSN.—15th annual convention, Jan. 23-25, Edgewater Gulf Hotel, Miss. Assn. headquarters, 1042 National Press Bldg., Washington, D. C.

PLANT MAINTENANCE & ENGINEERING SHOW—7th annual conference, Jan. 23-26, Convention Hall, Philadelphia. Society headquarters, Clapp & Polick, Inc., 341 Madison Ave., New York.



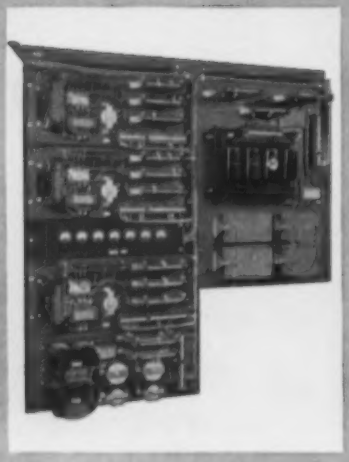
ALLIS-Processing

Allis-Chalmers constant potential and variable voltage systems are providing dependable precision control in many of the nation's largest mills.

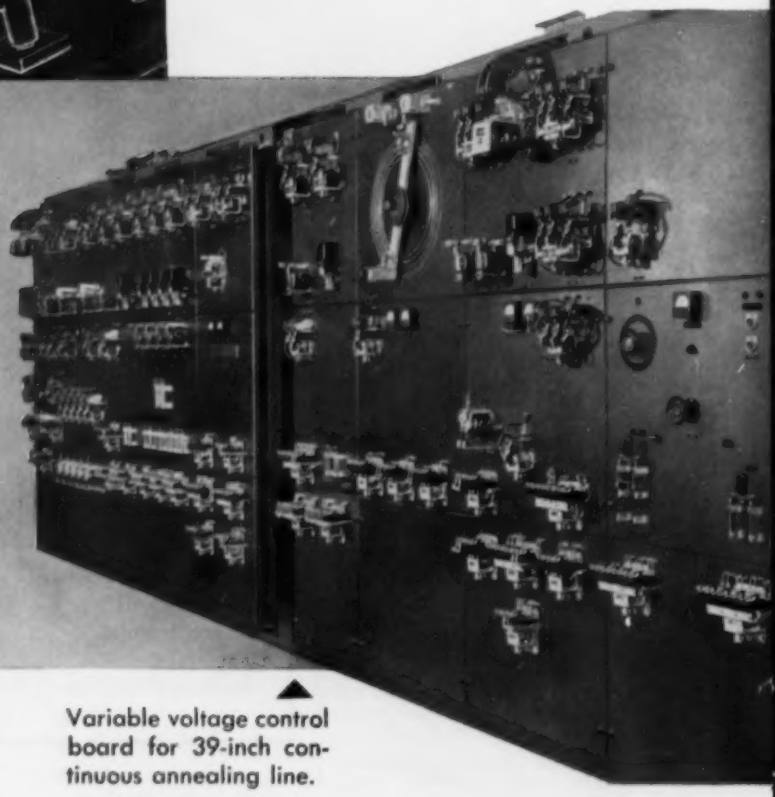
When you modernize

to meet the double challenge of a growing market and heavy competition, take advantage of Allis-Chalmers experience. See your nearby representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4639



Magnetic amplifier speed regulatory panels.



Variable voltage control board for 39-inch continuous annealing line.

A-C ALLIS-CHALMERS

ALLIS-

CHALMERS Line Control

Entry section control board for pickle line.

Delivery section control board.

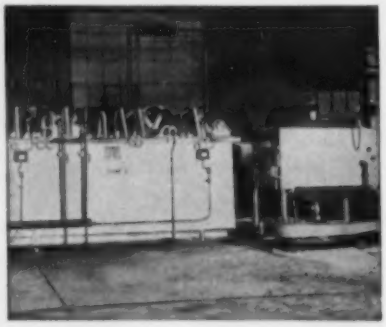
Delivery end operator's desk, stainless steel top.

Riveter's cabinet, stainless steel front.

CHALMERS

TITANIUM STRIP is descaled continuously on time cycles as low as 30 seconds, with excellent results.

10-MINUTE IMMERSION loosens scale on 5 tons of stainless wire. A water quench, 3-minute acid dip, and final water rinse produce a clean, bright surface with no pitting or etching.



LIGHT-GAUGE ALLOY STRIP is descaled at 20-35 ft. per min. in this Virgo bath, after annealing.

Use this fast, safe Hooker Process for descaling steel and titanium

Descale alloy steels and titanium in any form—rapidly, safely—using the Hooker Process with Virgo® Descaling Salt.

A bath of molten Virgo Descaling Salt quickly converts scale, rust, and other surface impurities to an acid-soluble coating. A quench, acid dip, and final spraying then remove this coating in from one-tenth to one-hundredth the usual pickling time, with no measurable effect on the base metal.

You can easily set up the Hooker Process for batch or continuous operation on any form of work including strip, sheets, bars, wire, tubes, plate, castings, forgings, and fabricated parts. You can usually process work as fast as your handling methods allow, with a minimum of supervision. Operation is safe for personnel, and there is little or no spent-acid disposal problem.

You can profit by the experience of more than 50 companies now using the Hooker Process successfully to speed up descaling of alloy steels and titanium in practically every form.

You'll get quick service on any descaling problem, by writing or phoning us. Complete test and engineering facilities are at your disposal, without obligation.

Send for these bulletins—Get the whole story on Virgo Descaling Salt for alloy steels and titanium . . . how the Hooker Process works, its advantages, how to set up a Virgo descaling line, and the services you enjoy as a user. No obligation. Write us today.

1905—Half a Century of Chemicals
From the Salt of the Earth—1955

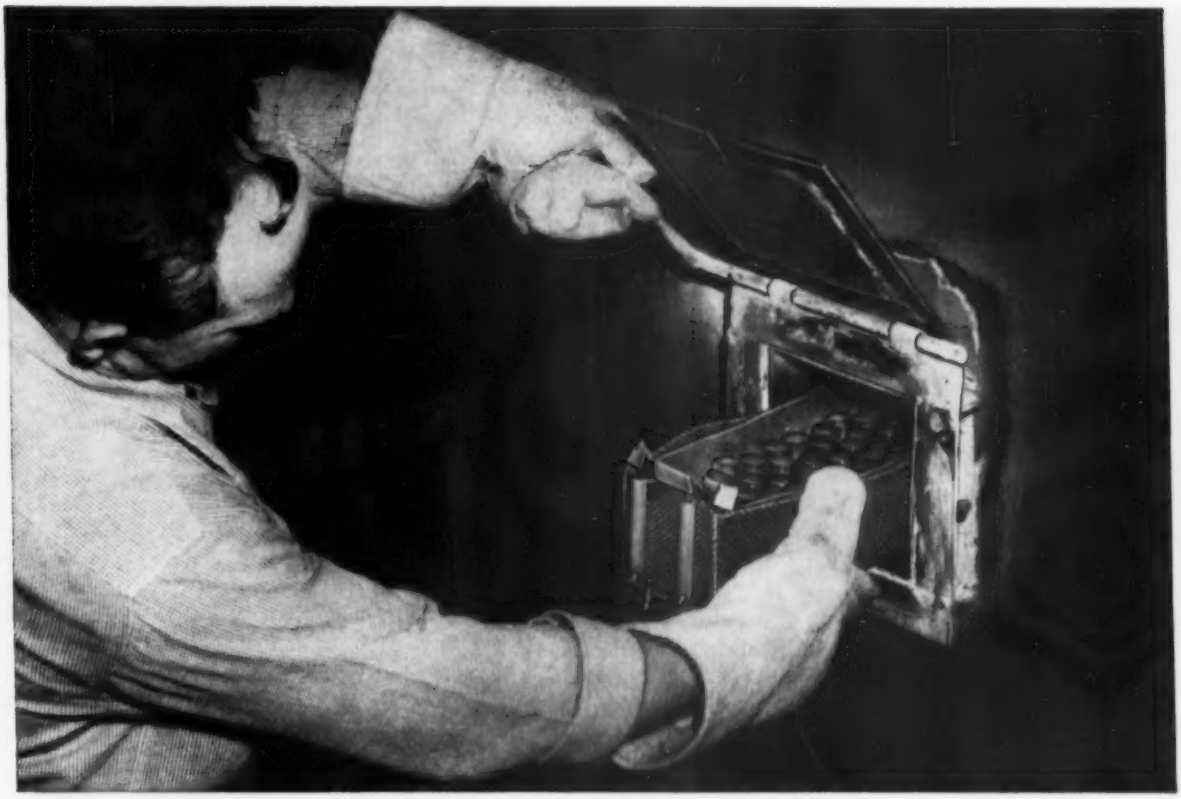
HOOKER ELECTROCHEMICAL COMPANY

33 Thirty-seventh St., Niagara Falls, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

HOOKER CHEMICALS

4-1000



720 Hours at 2300 Deg. F ...Didn't Hurt This Muffle

Continuous exposure at 2300 deg. F had little effect on a muffle made of HASTELLOY alloy X and used in this electric annealing furnace. The muffle was subjected to the intense heat for an entire month, 24 hours a day. After this extended service it was examined, found to be in excellent condition, and put back in service.

Actually, HASTELLOY alloy X solved a dual problem for this Company. The muffle is used in a furnace for annealing cold-drawn parts. Periodically, it is used for annealing superalloy parts at 2300 deg. F. Most of the time, however, it is used to anneal stainless steel parts at lower temperatures. Other materials were either inadequate for this service or too costly. Only HASTELLOY alloy X could handle both conditions economically.

HASTELLOY alloy X is a wrought high-temperature alloy with excellent strength and oxidation resistance to 2300 deg. F. For a copy of a booklet describing HASTELLOY alloy X, get in touch with the nearest sales office listed below.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Sales Offices

Chicago · Cleveland · Detroit · Houston · Los Angeles · New York · San Francisco · Tulsa

"Haynes" and "Hastelloy" are registered trade-marks of Union Carbide and Carbon Corporation.

Your end walls will last longer

with Kaiser Periclase-Chrome Brick

Open hearth operators have discovered two important facts about Kaiser Periclase-Chrome Brick:

1. It can greatly increase end wall life if needed.
2. If end wall service is balanced, thinner walls can be used to reduce cost.

That's because the special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

Let your Kaiser Chemicals sales engineer explain how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

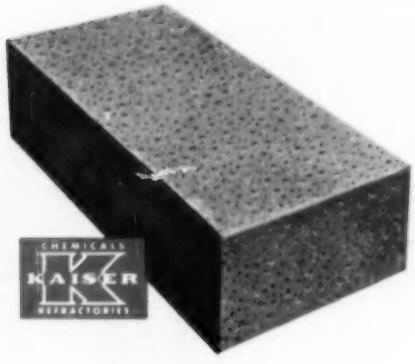
For the ultimate in steel furnace refractories

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

think of Kaiser Chemicals

Pioneers in Modern Basic Refractories



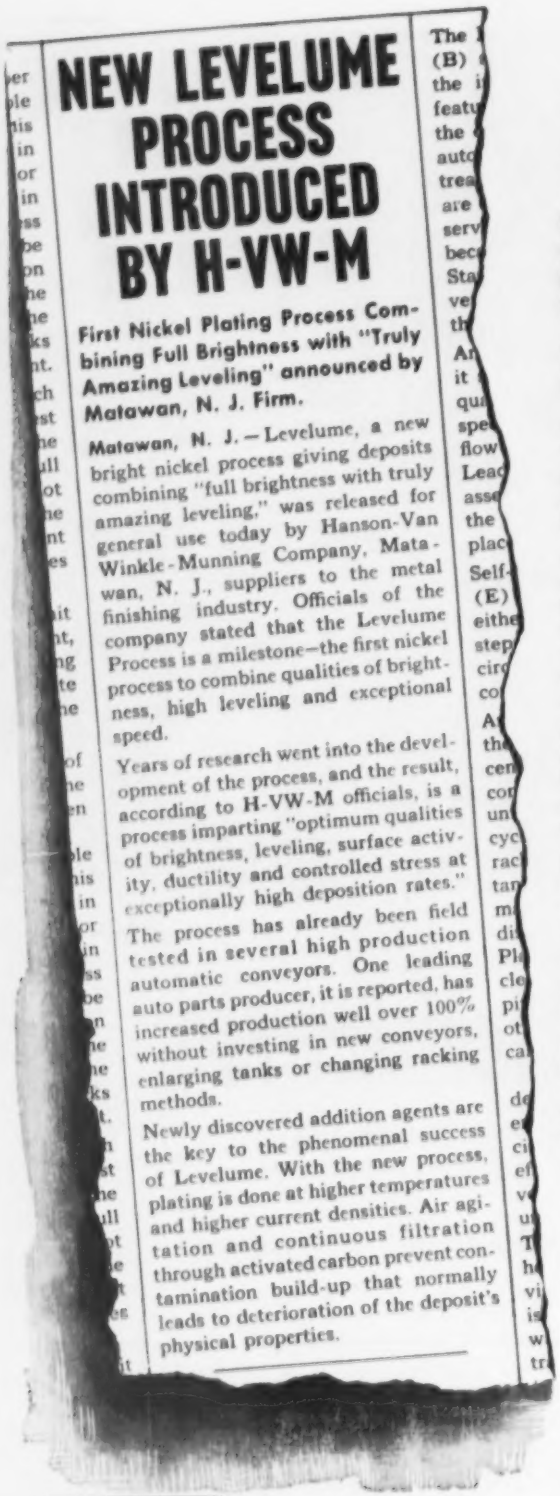
REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Periclase Brick (D-S)
- Periclase Chrome Brick
- Chrome Periclase Brick

Now available! **A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request



NEW LEVELUME PROCESS INTRODUCED BY H-VW-M

First Nickel Plating Process Combining Full Brightness with "Truly Amazing Leveling" announced by Matawan, N. J. Firm.

Matawan, N. J.—Levelume, a new bright nickel process giving deposits combining "full brightness with truly amazing leveling," was released for general use today by Hanson-Van Winkle-Munning Company, Matawan, N. J., suppliers to the metal finishing industry. Officials of the company stated that the Levelume Process is a milestone—the first nickel process to combine qualities of brightness, high leveling and exceptional speed.

Years of research went into the development of the process, and the result, according to H-VW-M officials, is a process imparting "optimum qualities of brightness, leveling, surface activity, ductility and controlled stress at exceptionally high deposition rates."

The process has already been field tested in several high production automatic conveyors. One leading auto parts producer, it is reported, has increased production well over 100% without investing in new conveyors, enlarging tanks or changing racking methods.

Newly discovered addition agents are the key to the phenomenal success of Levelume. With the new process, plating is done at higher temperatures and higher current densities. Air agitation and continuous filtration through activated carbon prevent contamination build-up that normally leads to deterioration of the deposit's physical properties.

Levelume

READ ABOUT THE NEW PRODUCTION-PROVED H-VW-M NICKEL PROCESS THAT COMBINES BRIGHTNESS AND EXCEPTIONAL LEVELING WITH UNUSUALLY HIGH SPEED

This outstanding, new, high-speed LEVELUME PROCESS has all these advantages—

HIGH BRIGHTNESS—Recessed areas have uniform brightness without shading . . . subsequent deposits are brighter.

EXCEPTIONAL LEVELING — Because of high scratch-filling properties, polishing and buffing can be substantially reduced, sometimes even eliminated. Enormous savings result.

WIDE CURRENT DENSITY RANGE—Can vary from 20-150 asf (normal 60-100 asf). Higher current densities mean faster plating and reduction in equipment, floor space and manpower.

HIGH THROWING POWER—Recesses are covered satisfactorily and good distribution of deposit makes specification conformance possible without piling-up nickel on exposed portions.

CONTROLLER STRESS—No cracking, crazing, lifting or brittleness of deposits.

HIGH DUCTILITY — Comparative tests show good ductility which is maintained even after continued bath use.

EXCELLENT CORROSION PROTECTION—Equal to deposits from other bright or leveling solutions.

VERSATILE—Can be used as single coating or, if higher corrosion protection is desired, a Nickle-Lume top coat can be applied.

EASY SOLUTION CONVERSION TO LEVELUME — With few exceptions other bright nickel baths can be converted.

HIGH SURFACE ACTIVITY—Plated surfaces accept chromium and other deposits without activating treatments. You'll experience none of the ordinary difficulties of other bright nickel processes when you use LEVELUME. One manufacturer reduced chromium plating rejects 12 per cent using Levelume.

— and these advantages, too . . .

- Bath Stable in Operation
- Pleasing White Color Deposits
- Simple Control
- No Objectionable Fumes
- High Tolerance to Impurities
- Low Operating Costs

LEVELUME is already proving its unusual value to enthusiastic users across the country. You can get complete details, and the Levelume Instruction Manual, by writing H-VW-M.

PLATEMANSHIP

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY

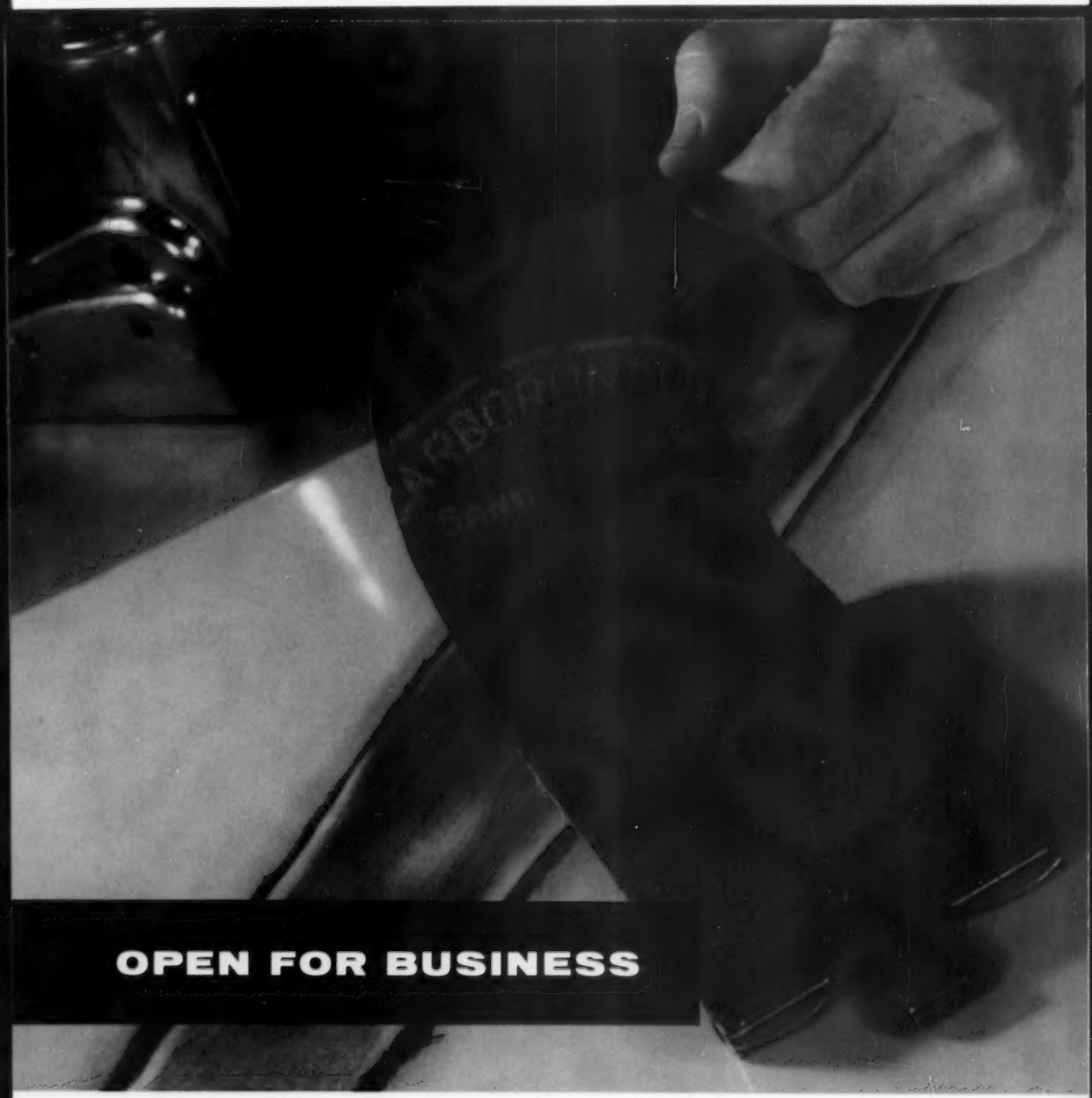
Plants: **Matawan, New Jersey • Grand Rapids, Michigan**

SALES OFFICES: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston Bridgeport • Chicago • Cleveland • Dayton • Detroit • Grand Rapids Los Angeles • Louisville • Matawan • Milwaukee • New York • Philadelphia Pittsburgh • Plainfield • Rochester • St. Louis • San Francisco • Springfield (Mass.) • Utica • Wallingford (Conn.)

H-VW-M

© 1937

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES



"SAND SCREEN's" unique open-mesh construction lets removed material flow *right through*...instead of loading or glazing, like conventional paper and cloth. What's more, *both* sides are usable—give you 7 to 15 times longer life. Use "SAND SCREEN" wet or dry, by hand or machine. It tears and folds easily to any desired size. Cut sheets fit oscillating or vibrating machines. "SAND SCREEN" Discs give best results when used wet with CARBORUNDUM's FASTCUT® Pad 85 Assembly. Try it—see how it slashes polishing and finishing costs in your shop. For a free sample, call your CARBORUNDUM Distributor or salesman, or write The Carborundum Company, Niagara Falls, N. Y. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ont.

Through product quality and application "know-how"

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

PHOTOGRAPHED AT MORRISON STEEL PRODUCTS, INC.

One look at this new Resin Sander Disc by CARBORUNDUM tells you it's no sissy. One trial in your shop *proves* how tough it is. It bites into metal fast...cuts free and cool...stays sharp from start to finish. The rugged all-fibre backing, plus a resin bond with greater holding power, means far more work per disc. The edge holds shape longer, even on your most severe grinding jobs. Resin Sander Discs are designed for both snagging and surfacing operations, come in types and sizes to fit all Disc Sanders.

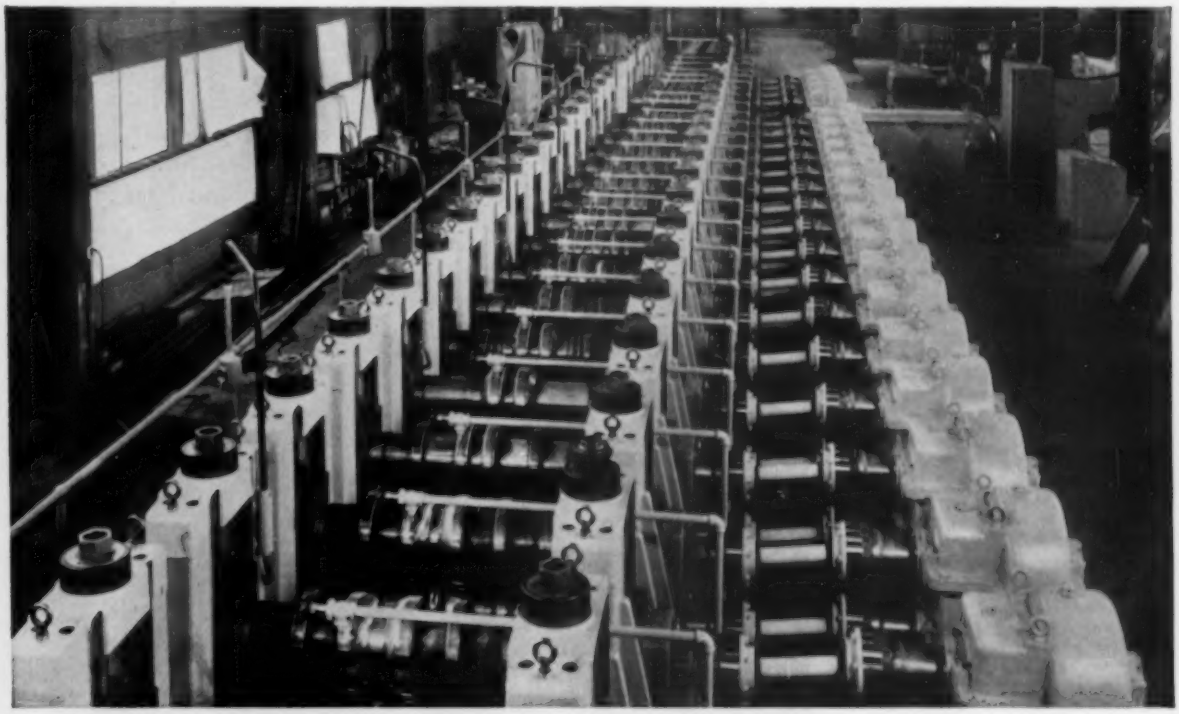
For a free demonstration of this new cost-cutter, call your CARBORUNDUM Distributor or salesman today. Or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar



Here is the greatest advance in rolling since anti-friction bearings

Constant velocity universal joints provide four profit-making improvements by:

- **Allowing stepped-up rolling speeds**
- **Reducing mill down-time**
- **Increasing size range of mills because Rzeppa Joints provide smooth operation at angles of 15° *or more.***
- **Providing better surface finishes**

Pictured is the most advanced and largest cold forming mill in the world—developed by the American Roller Die Corporation.

HOW TO GET COMPLETE INFORMATION ON THE PROFIT ADVANTAGES OF RZEPPA JOINTS

You can get more information on how Rzeppa Joints can fit into your rolling operations. Write, wire, or phone today. We'll send the brochure or have a factory representative call —as you wish.

RZEPPA (Pronounced "SHEPPA")

CONSTANT VELOCITY

UNIVERSAL JOINTS

The Gear Grinding Machine Company

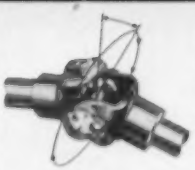
3917 Christopher
Detroit 11, Michigan

Manufacturers of

- **Fully Automatic Gear Grinding Machines**
- **THE DETROIT SCREWMATIC 750**

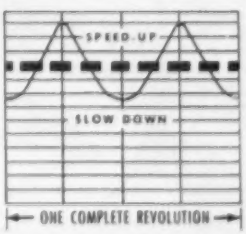
COMPARISON OF OPERATION

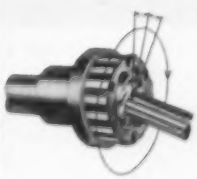
Rzeppa Versus Pin or Slipper-Type.



During rotation at a given angle, pin or slipper-type joint speeds up, slows down twice during one revolution.

Solid line shows speed variation for one revolution of pin or slipper-type joint at a critical angle. Note constant velocity of 100% for Rzeppa Joint (dotted line).

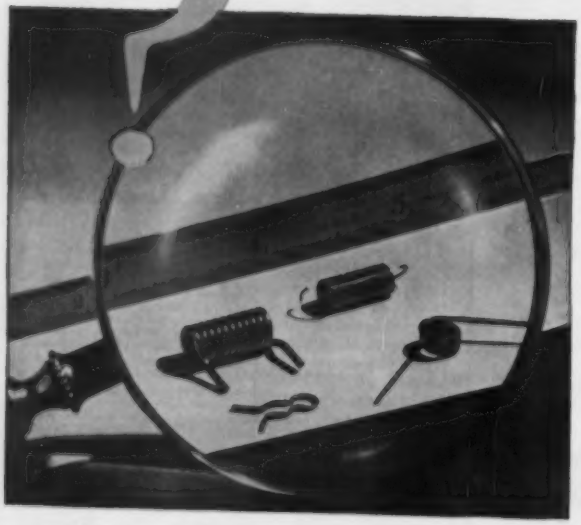




Due to its construction features, the Rzeppa Joint always transmits a smooth flow of power even at unbalanced angles. The standard joint cannot meet this test without involved compensating measures.

BIG springs?

-little springs?



-simple springs?

Get custom-made performance and volume prices with American Quality Springs

-tricky springs?

SOME OF OUR BEST CUSTOMERS still find it hard to believe that American Steel & Wire can turn out such an incredible variety of springs: we make extension springs, compression springs, torsion springs, motor springs, flat spiral springs, flat springs, and wire forms with an endless variety of end formations. Cold wound, hot wound and heat treated.

Materials? Carbon steel wire, hard drawn, oil tempered and annealed, music wire, chrome-vanadium wire, Stainless Steel, monel, phosphor bronze, brass or just about any other spring metal you can name.

Finishes? Springs can be supplied ground, polished, shot blasted, ball blasted; coated with japan, lacquer, zinc, cadmium, copper, nickel or just about any other material that can possibly be applied.

American Steel & Wire can supply completely fabricated spring assemblies, too. A complete assembly department can produce, *at low cost*, such items as parking brake assemblies.

Take advantage of our complete spring engineering design service, this great range of varieties; get rapid delivery and low prices—with American Quality Springs. Just call your nearest AS&W salesman.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

USS AMERICAN QUALITY SPRINGS

UNITED STATES STEEL

IT'S THE NEW, "YEARS-AHEAD" LINE ...

Far out front on every point of comparison

COMPLETE LINE FROM 50 TO 775 TONS

NIAGARA MACHINE & TOOL WORKS 1879 75 1954

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

... NIAGARA

ALL STEEL PRESS BRAKES

"MULTI-MACHINE" VERSATILITY TO BOOST PRODUCTION

Practically limitless in their scope of forming, bending, punching, blanking and related operations, Niagara Press Brakes get more done for you because they do more jobs. One reason: Advanced design. Another: The extensive line of Niagara Press Brake Dies available.

UNIFORM BENDS WITH STRAIGHT-EDGE ACCURACY

Double end twin drives with double reduction gearing, *on all models*, provide uniform, constant application of power at both ends of the ram. Off-center loading presents no problem.

Rugged, streamlined frames feature box type crowns of unequaled strength and rigidity, assuring maximum resistance to deflection and permanent alignment of bearings and ram.

3-SHIFT STAMINA TO HANDLE WORK-HEAVY SCHEDULES

Close attention has been given to every design detail. Nothing has been overlooked. Each frame size has been scientifically tested to detect and eliminate harmful stresses at all critical points.

Laminated non-metallic ways, an exclusive Niagara feature, reduce wear to an absolute minimum, providing accurate alignment and longest possible service life. All gearing is totally enclosed in sealed oil baths for thorough, clean lubrication.

Once again, Niagara's forward-thinking engineering has produced a metal working machine years ahead of its time. As you become familiar with the significant developments embodied in this revolutionary new line of all steel press brakes, you will realize why it carries the Niagara nameplate. After all, who is more uniquely qualified to be its builder than the builder of America's most famed and most complete line of presses, shears, other machines and tools for plate and sheet metal work?

Call in your nearest Niagara representative at once. Let him tell you, *in detail*, what these great, new press brakes can *do* for you.

CHECK ALL THE FACTS, YOURSELF!

Compare. Make a careful, feature-by-feature appraisal of Niagara's years-ahead press brake design. Write for new Bulletin 89C . . . the most comprehensive press brake literature ever published.

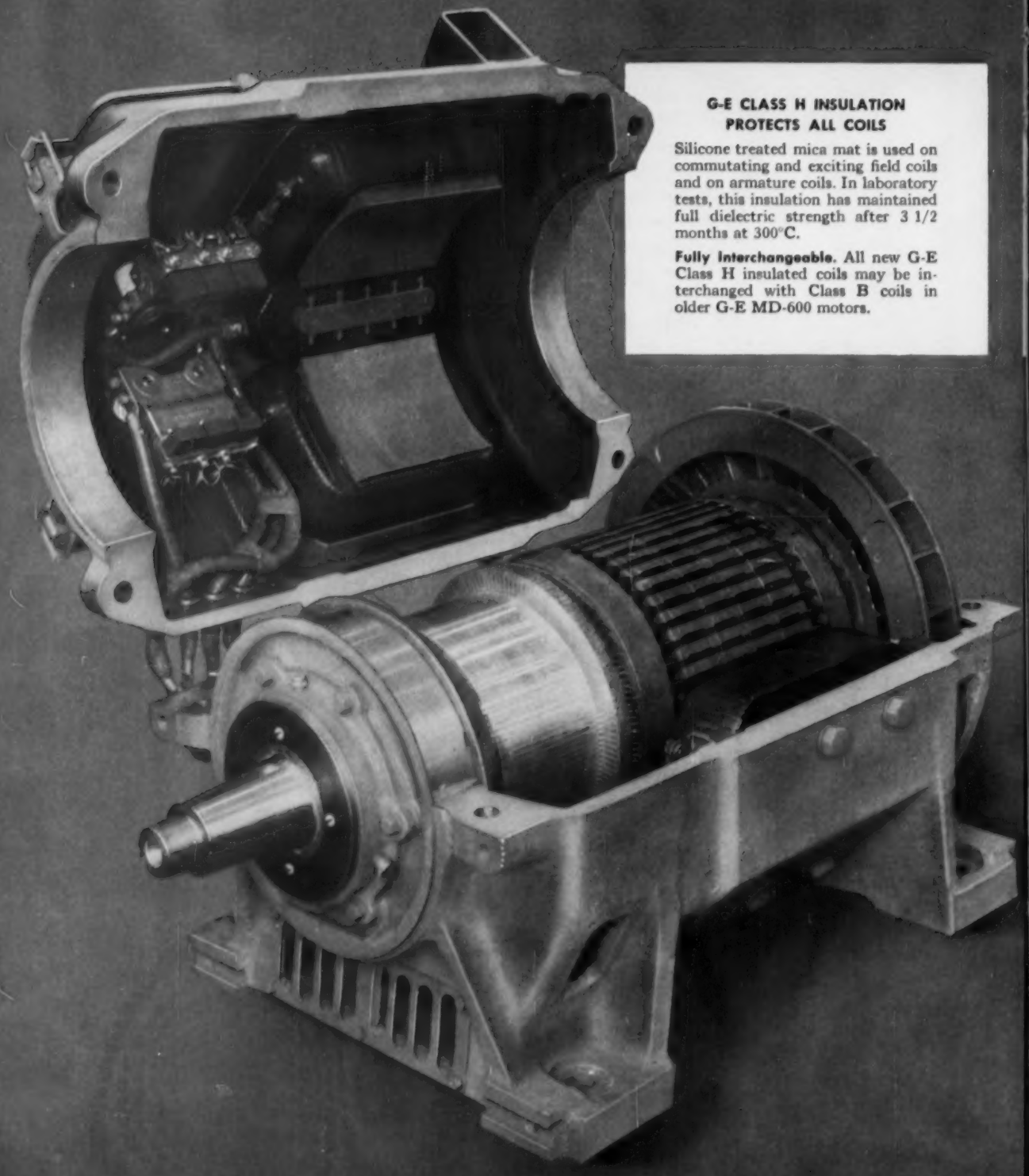
NIAGARA MACHINE & TOOL WORKS
BUFFALO 11, N. Y.
DISTRICT OFFICES:
Buffalo • Cleveland • Detroit • New York • Philadelphia
Dealers in principal U. S. cities and major foreign countries

engineered to expand your output ...AT SAVINGS!

PROGRESS IN
DIRECT-CURRENT DRIVES

NOW! Roastouts

NEW G-E MD-600 MOTORS



G-E CLASS H INSULATION PROTECTS ALL COILS

Silicone treated mica mat is used on commutating and exciting field coils and on armature coils. In laboratory tests, this insulation has maintained full dielectric strength after 3 1/2 months at 300°C.

Fully interchangeable. All new G-E Class H insulated coils may be interchanged with Class B coils in older G-E MD-600 motors.

Virtually Eliminated on . . .

WITH CLASS H INSULATION

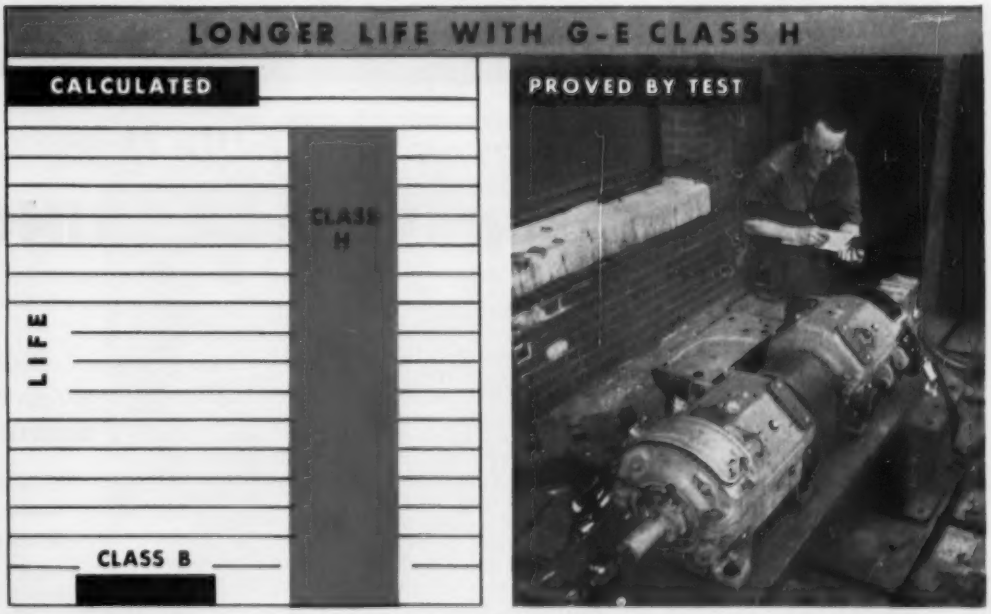
G.E. offers—in all MD-600's—Class H Insulated Coils

WHAT IS CLASS H? General Electric research has developed a combination of inorganic and silicone materials for a new insulation system now used in all MD-600 motors. These Class H materials will withstand temperatures up to 180°C continuously.

BETTER FOR HEAVY DUTY. Auxiliary mill motors often encounter unexpected high ambient temperatures, unforeseen extended duty or emergency conditions. Any one of these can cause "roastouts" from temperatures higher than the insulation capacity. The new G-E Class H insulation will resist up to 50°C more than Class B, resulting in longer motor service.

REWINDS ELIMINATED? On normal duty, insulation failure may be eliminated as the limiting factor in continuous armored motor service. Engineers calculate that each 10°C rise in temperature reduces the life of a given type of insulation by half. *Since G-E Class H will withstand 50°C higher than Class B, its life* **at the same temperature** *should be increased 2^5 or 32 times!*

YOUR G-E SALES REPRESENTATIVE HAS COMPLETE INFORMATION. Contact him at your nearby G-E Apparatus Sales Office, or write Section 812-1, Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.



ENGINEERING STUDIES indicate that under identical operating conditions new G-E Class H insulated coils in MD-600 motors will last up to *32 times* as long as conventional Class B coils. Insulation failure may be eliminated as the limiting factor in continuous auxiliary mill motor service.

ACTUAL TEST with Class H and Class B motors coupled together *proves to date* the new insulation will last more than twice as long as the old. After burning out two Class B insulated motors, the one with Class H coils is still operating under exaggerated load, vibration and atmospheric conditions.

Progress Is Our Most Important Product

GENERAL ELECTRIC

"Amazing how little this **TORRINGTON NEEDLE BEARING** *costs!"*

Initial cost of the Torrington Needle Bearing is much less than that of any comparable anti-friction bearing. But economy in first cost is only the start of savings which accrue to users of the Needle Bearing.

Because of its unit construction and small size, housings and related members can be made smaller and lighter.

Ease of installation trims costs on the assembly line, too. Just a simple operation on an arbor press places the hardened outer shell of the Needle Bearing in the housing.

Throughout the life of the completed assembly, the Torrington Needle Bearing continues to pile up benefits. Low friction, high load capacity and retention of lubricants all contribute to the characteristically long service life of Needle Bearings.

For twenty years, our Engineering Department has helped designers and manufacturers throughout industry to adapt the unique advantages of the Needle Bearing to their products. Let us help you make the Needle Bearing "standard equipment" in yours.

See our new Needle Bearing Catalog in the 1955 Sweet's Product Design File —or write direct for Catalog No. 55.

THE TORRINGTON COMPANY
Torrington, Conn. • South Bend 21, Ind.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON *NEEDLE* **BEARINGS**

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

These features make the **TORRINGTON NEEDLE BEARING** *unique*

- low coefficient of starting and running friction
- full complement of rollers
- unequalled radial load capacity
- low unit cost
- long service life
- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts

EARLY JOB PLANNING preceded production of the G-E J47 nozzle. Here, David Nelson, design engineer; Felix Scopelliti, production manager; William F. Steinen, president; and Ernest Tedesco, quality control director, discuss contract.

Industry benefits as G-E defense subcontractor adapts new-found skills to peacetime production

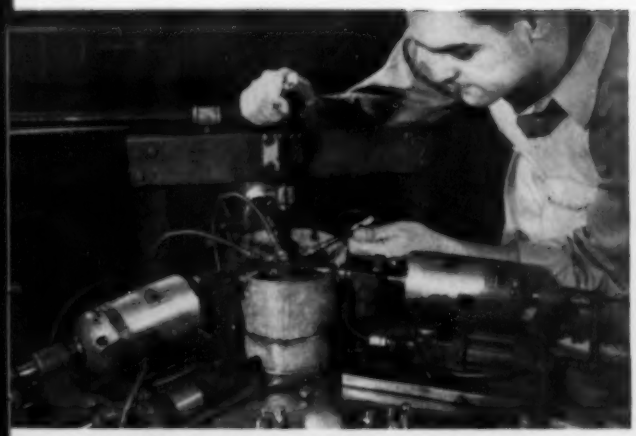
Co-operation on defense jobs between General Electric and small Newark business firm leads to new machine designs and techniques—now available to other industries

Since 1907, the William Steinen Manufacturing Company of Newark, New Jersey, had been growing slowly as a producer of screw machine parts and metal stampings. With the Korean War, however, defense subcontract orders from General Electric required swift production changes, and the small company responded with imagination and efficiency.

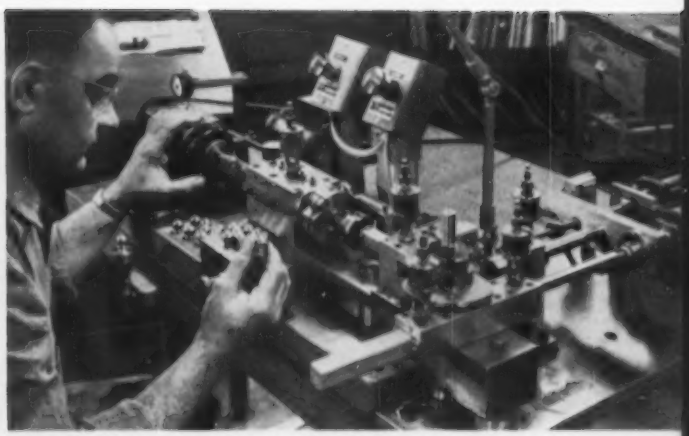
One tremendous challenge was the requirement of extremely close tolerances for G.E.'s J47 jet engine nozzle. To fulfill the requirement, Steinen hired more expert personnel, enlarged its engineering staff, designed new machines. Result: reduced unit cost, delivery on schedule, high quality, and more G-E contracts. At present Steinen is engineering and developing nozzles for even more advanced G-E engine projects.

With growth came new abilities. Exacting G-E contracts meant much more than a greatly increased employee roster and added machines. It meant the development of new skills, versatility, and capacity. And today—even though Steinen sales will hit an all-time high of $1,900,000 in 1955—less than 10% of this is defense work. The company has smoothly switched the bulk of its production to peacetime industrial needs.

A proving ground for industrial production. G-E defense contracts have helped many small businesses "grow up" to the American economy's expanding needs. In a climate of peace, these companies are adapting to the stretch-out of defense orders from the Korean peak, matching their new capacities and standards to the demands of industry—an excellent example of large and small business co-operating for mutual benefit. 660-4



TRIPLED PRODUCTION resulted from this Steinen-built machine which cross-drills three wiring holes in jet nozzle bodies at one time, instead of singly.



ELIMINATING A SLOW HAND OPERATION, and reducing costs, this machine was specifically designed by Steinen for precision reaming of holes in jet nozzles

MODERN PACKAGING developed by Steinen utilizes clear plastic tube in which nozzle assemblies have high visibility, and are easily selected.

SWIFT GROWTH required expanded accounting and purchasing department. William Steinen, Sr., (in vest) founded company forty-eight years ago.

VOLUME PRODUCTION on short notice is possible at Steinen because a large variety of metal stocks is always on hand in company's storage areas.

EXHAUSTIVE TESTING, such as this test of nozzle's spray angle, enables Steinen to meet the rigid standards set by General Electric and other prime contractors.

CAN SMALL BUSINESS HELP YOU?

Thousands of small businesses, like the William Steinen Mfg. Co., have furnished General Electric with practically every kind of skill and services as defense subcontractors and suppliers. Many of these companies have available production capacity, created in large part by the reduction of defense orders since the Korean War peak. This means that they may be able to apply their skills to help you with your production.

If you have a manufacturing problem or have work available for subcontracting, please write us on your letterhead stating in as much detail as possible the type of services or skills you require. We will be glad to suggest several small businesses who have done similar work for us and may be able to help you. Write to C. W. Bryant, Manufacturing Services Division, General Electric Co., 570 Lexington Ave., New York 22, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

18 Smooth, Uniform Braze Welds in 8 minutes Add Economy to Quality in Peabody Classroom Chairs

Braze welded frame of PTAR Tablet Armchair

Braze welded frames for Peabody school furniture—combination of chair and open-front table.

Anaconda-997 Low-Fuming Bronze Rods Make Well-Shaped Braze Welds, Essential for Eye Appeal and Extra Strength, Says Leading School Furniture Manufacturer—and Lower Production Costs too.

The Peabody Seating Company, Inc., North Manchester, Ind., has been making quality school furniture since 1902. Well-shaped braze welds, they say, are essential to maintain this quality. And they have found that Anaconda-997 Low-Fuming Bronze Rods make this kind of joint, not only adding eye appeal but providing the extra strength needed in school furniture.

By depositing smooth-flowing and low-fuming weld metal, these rods promote faster, more uniform work and thereby reduce production costs. The 18 braze welds pictured are made in 8 minutes—an average of about ½ minute per joint.

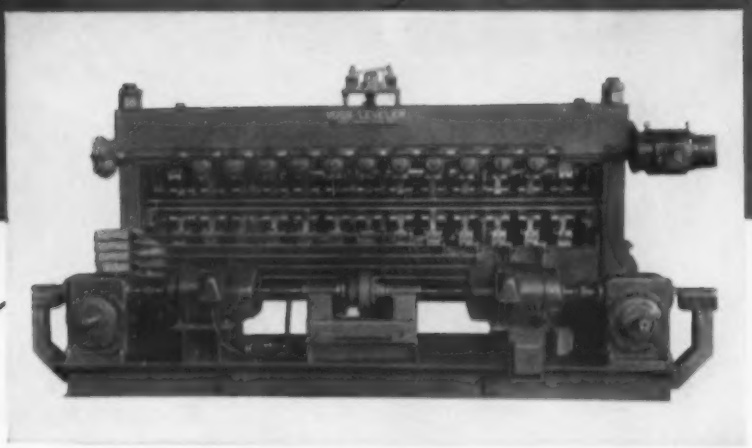
Anaconda-997 Low-Fuming Bronze is a superior welding rod used to join gray and malleable cast iron, steel and copper alloys by the oxyacetylene process. It is also used for repair welding, and to deposit bearing surfaces on steel and iron. You can get other Anaconda Copper Alloy Welding Rods for many different production and repair purposes. They are sold by distributors of welding equipment everywhere. Anaconda distributors are also a good source of practical advice on welding problems. Purity Cylinder Gases, Grand Rapids, Mich., and Warsaw, Ind., furnish Peabody with Anaconda-997 Rods. For additional information write for Publication B-13. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. AA1256

ANACONDA®

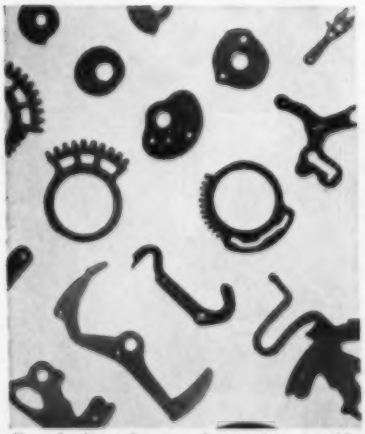
WELDING RODS

How to inject exacting flatness standards into your products without slowing output from your strip or plate department

This large Voss Leveler flattens aluminum alloy tapered sheets 120" wide.



this VOSS LEVELER built by BLISS



Easy-feeding advantage has made it possible to use small Voss Levelers to flatten and stress-relieve stamped machinery parts like these.

If customer demands for dead-flat sheet, strip or plate are cutting into your production, it's time you investigated a Voss Leveler. This remarkable machine practically eliminates the leveling bottleneck by flattening material to stretcher-leveler standards at roller-leveler speed.

The machine is basically a roller leveler with long, slender, individually-driven work rolls supported by a series of short, heavy back-up rollers that maintain the longitudinal alignment of the work rolls and provide precise control of the deflections produced in the material passing through the machine.

By special arrangement with Voss Engineering Company, Bliss builds Voss Levelers to customers' requirements for flattening any of a wide range of gages and widths of ferrous or non-ferrous materials, including sheets, strip, and stamped or perforated parts. Speeds range up to 1200 feet per minute, depending on the gage and temper of the material.

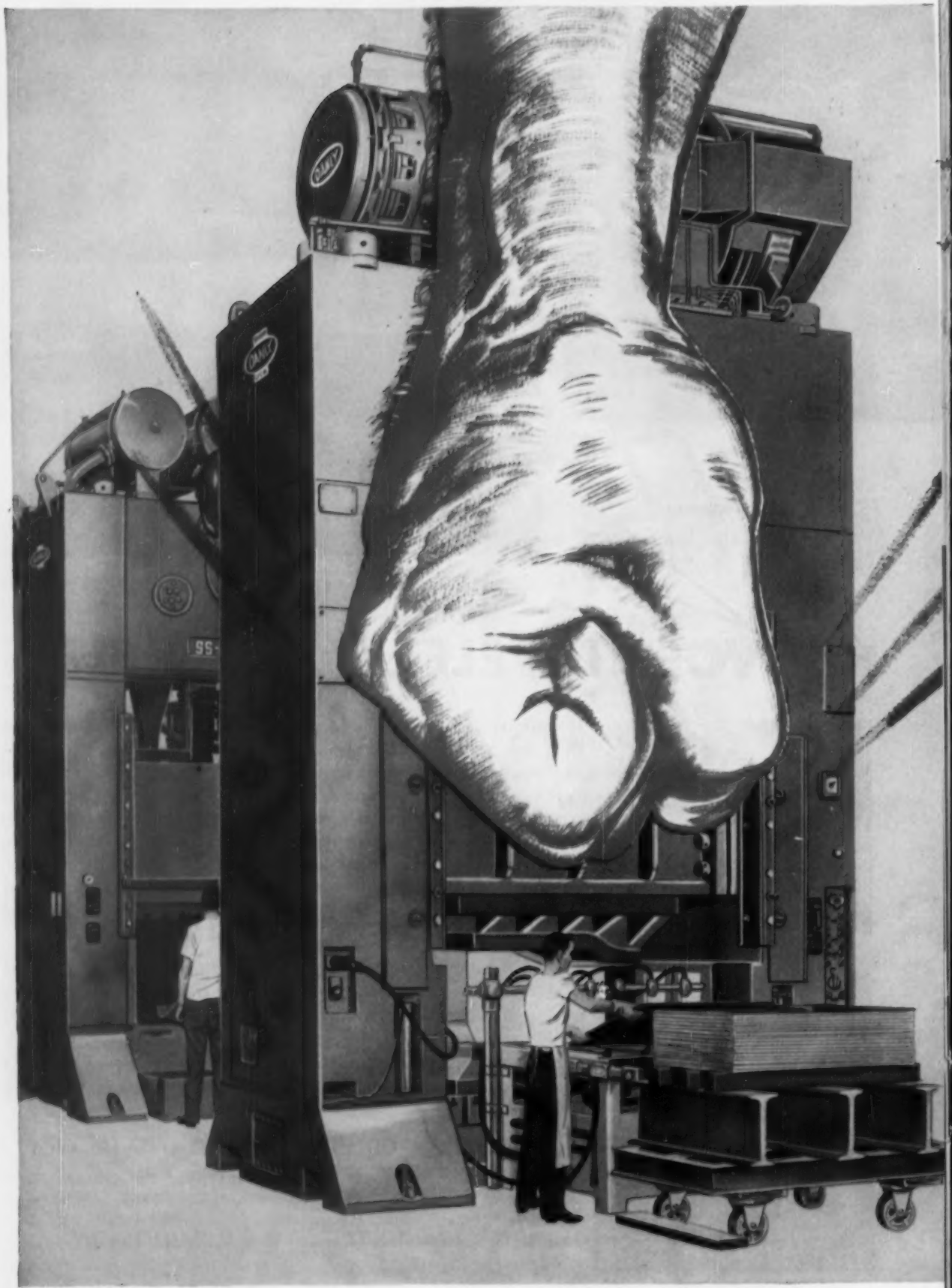
So . . . if your present flattening methods aren't fast enough for you or precise enough for your more exacting customers . . . write us now for a copy of the new leaflet describing Voss Levelers and their applications.

BLISS
SINCE 1857

E. W. BLISS COMPANY, General Office: Canton, Ohio
ROLLING MILL DIVISION: Salem, Ohio
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

is more than a name . . . it's a guarantee

Plants: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Pittsburgh and Midland, Pennsylvania; San Jose, California
E. W. Bliss (England) Ltd., Derby E. W. Bliss Co. (Paris), France



Here, welds have "guts" to withstand

400 tons of PUNCH

A. O. Smith electrodes are used to weld this 400-ton Danly press... a massive double-action unit that turns sheet steel into functional shapes

DANLY MACHINE SPECIALTIES, INC., know that high-production machinery requires bonus strength and stamina. The company's presses are used to produce everything from small appliance parts to automobile bodies. Output ranges up to 1,000,000 stampings per eight hour day.

Danly chooses A. O. Smith electrodes to make welds that stand up to toughest production needs. Consider, for example, the electrode used by Danly to build the 400-ton press pictured at left:

SW-35 (AWS-E-6020) for deep groove horizontal fillet and downhand mild steel welding. A "hot" mineral type electrode. You get remarkable speed and extreme ductility. Operation is quiet with fine spray and smooth arc. Produce 45° fillets without undercut . . . obtain consistently good x-ray quality. Yield point, as welded, is 56,600 psi . . . stress-relieved 48,900 psi.

Want more facts about A. O. Smith electrodes? See your man from A. O. Smith . . . or write A. O. Smith Corporation, Welding Products Division, Milwaukee 1, Wis., for a complete electrode catalog.

The man from A. O. Smith...

Owen Lundgreen is the representative who helped Danly select the right A. O. Smith electrode for press production. More than just a salesman — a *real welding consultant* —your man from A. O. Smith is exceptionally qualified to help you with your welding problems.

Through research A.O. Smith *...a better way*

A.O.Smith

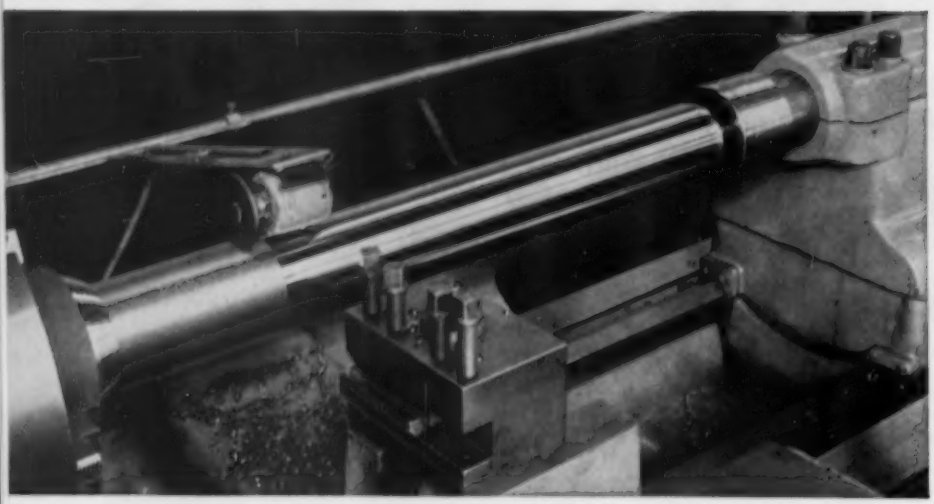
CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

International Division: Milwaukee 1, Wisconsin, U. S. A.

Normal speed for finishing this AISI 1045 shaft with carbide is 500 sfpm. (See tachometer above.) Only 7.4 cubic inches are removed in 2 minutes with .010" feed, 1/16" depth of cut.



With Carboloy Cemented Oxide, speed increased to 2000 sfpm, and 29.6 cubic inches were removed in the same time, under identical cutting conditions.

Limited offering available January 1 . . .

FINISH STEEL AT SPEEDS UP TO 7500 SFPM WITH NEW CARBOLOY CEMENTED OXIDE TOOLS

Carboloy® Cemented Oxide is an entirely new kind of cutting material, specially developed for steel finishing at speeds ranging from 300 to 7500 sfpm.

To date, Cemented Oxide tools have been used to cut steel with Brinell readings up to 300. Results have included more metal removed per minute, with finishes superior to those possible with carbide or HSS.

Tip stays cool

Performance evaluations at the Carboloy machinability laboratory and in customer plants prove Cemented Oxide cuts cleanly, resists edge wear and cratering. Even at extremely high operating speeds, the tip remains so cool it can be touched immediately after the cut.

Preliminary reports show Cemented Oxide can also improve efficiency of relatively low-speed equipment. Because this material provides longer tool life at higher speeds, output increases and cutting time is reduced.

Takes up where carbides leave off

Carboloy Cemented Oxide is not a typical ceramic or cermet. It is stronger and more resistant to chipping than typical ceramics. Four years in development, Cemented Oxide takes up where carbides leave off on high-speed steel finishing.

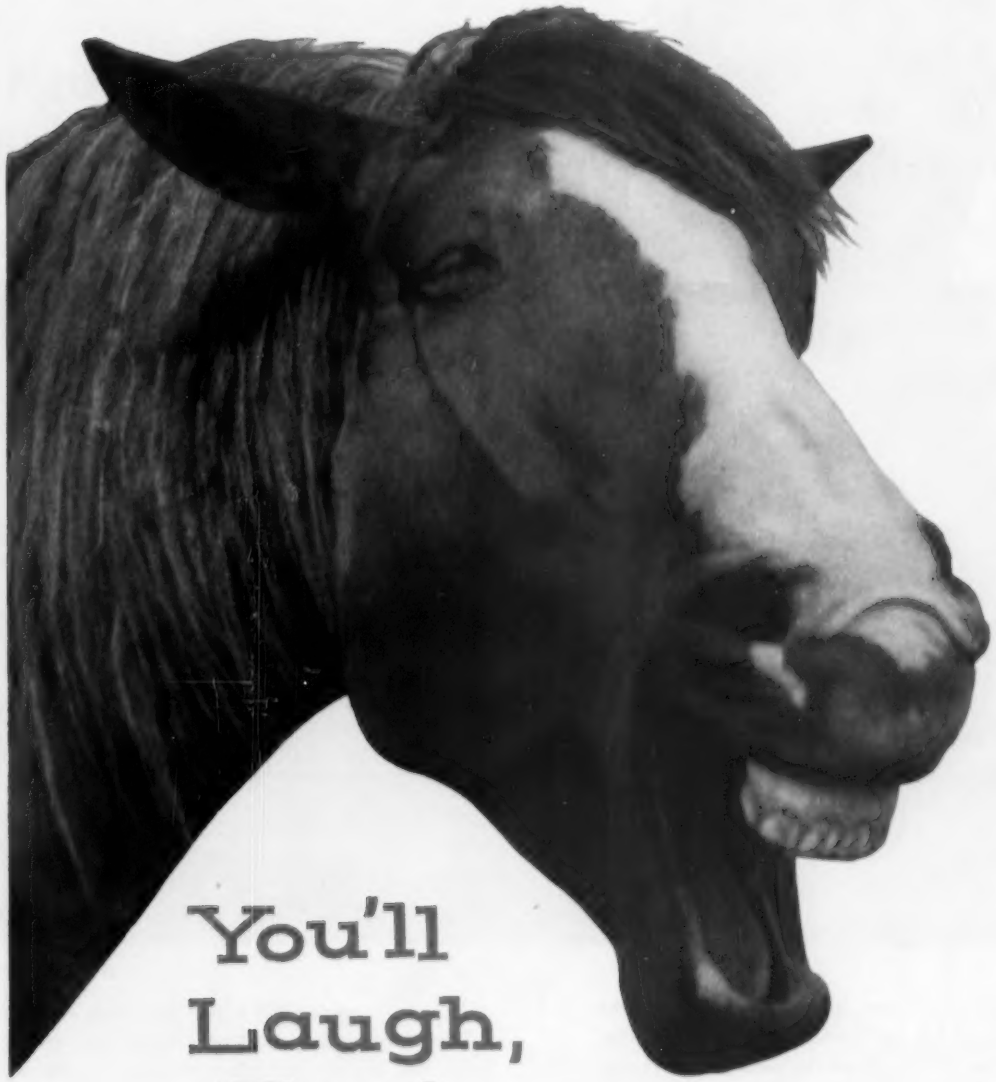
To aid full-scale commercial evaluation of Carboloy Cemented Oxide, a limited number of sizes and shapes will be available January 1. For the preliminary technical bulletin on Carboloy Cemented Oxide, write today.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11153 E. 8 Mile Street, Detroit 32, Michigan

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company



You'll Laugh, Too!

YOU'LL GIVE YOUR GRINDING PROBLEMS A LONG, DRAWN OUT HORSELAUGH WHEN YOU SWITCH TO CINCINNATI (PD) WHEELS.

For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

And you'll keep right on smiling with pleasure every day that CINCINNATI (PD) WHEELS are on the job. Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.* So, doesn't it make good horse sense to get full details on CINCINNATI (PD) WHEELS right away?

Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

CINCINNATI *Grinding Wheels*

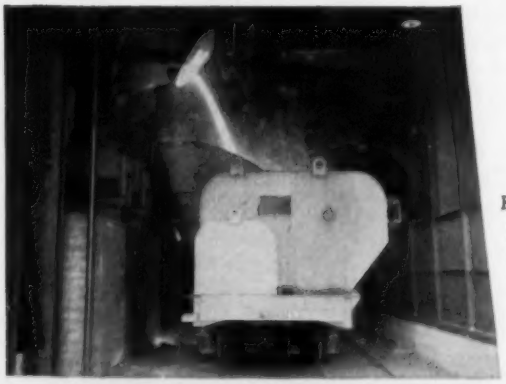
EC&M Control is Safe for Hot Metal Applications

Bessemer Converters operate *safely* under EC&M Control. This three-converter installation is typical of many EC&M controlled converters.

Wherever hot metal is stored, handled, or processed, many firms, acquainted with EC&M value, select this quality apparatus because of their confidence in it—in the engineering and experience which it represents.

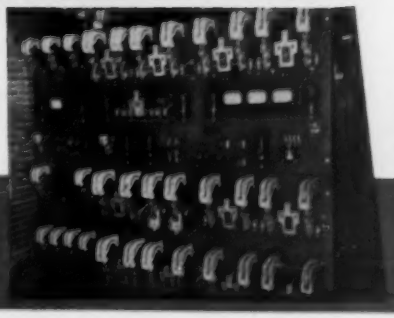
Typical hot metal applications include (1) Ladle Cranes, (2) Hot Metal Cranes, (3) Hot Metal Mixers, (4) Bessemer Converters, (5) Storage Vessels, (6) Ladle Cars—where only tried and true equipment, which represents the utmost in safety and dependability, is acceptable.

Listed below are a few of the EC&M products especially designed for the requirements of hot metal service. They have proved themselves highly successful in many applications throughout the years. Specify EC&M Control for hot metal applications.



Hot metal mixer pouring into hot metal car, both of which are operated by EC&M Control.

EC&M power-circuit type Limit Stops mounted on hot metal mixer (shown above), provide positive slowdown and final stopping.



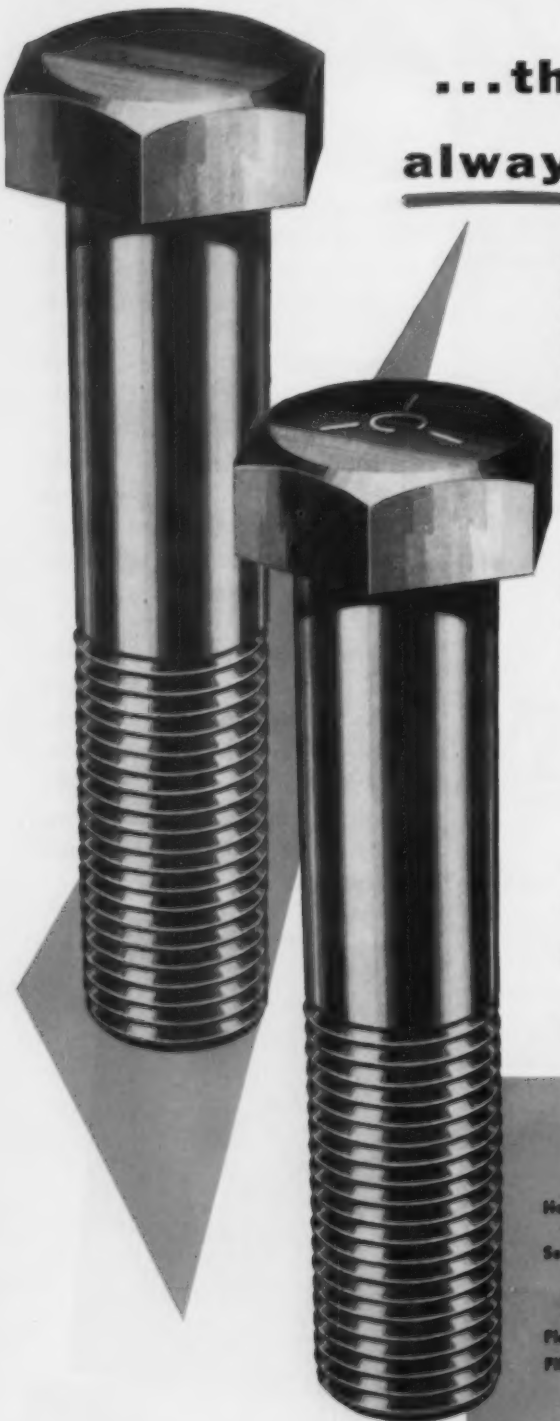
LINE-ARC Contactor Control for the hot metal car propel-motion.

EC&M EQUIPMENT
Especially Designed for Hot Metal Service

1. Basic Control Systems for Bessemers & Mixers, many originated by EC&M.
2. Dead - Man's Master Switch.
3. Air and Magnetically-released Brakes.
4. Positive-type Limit Stops for Slowdown and Final Stopping.
5. LINE-ARC Magnetic Contactor Controllers.

THE ELECTRIC CONTROLLER & MFG. CO.
4495 LEE ROAD • CLEVELAND 28, OHIO

Which is the CleCap?



...the one that's always ready for you

We're never "out of stock" on any of the popular sizes in High Carbon Heat Treated Cap Screws—CleCap's pride and joy among tough dependable hex head screws.

One thing you'll soon learn when you deal with CleCap—as cap screw specialists, we haven't so many irons in the fire that we can't keep our production well balanced and maintain stocks to meet demands. And we make it a point to stock many sizes and lengths not commonly listed.

It's good business to use these extra tough 1038s. And it's good business to order them from the hustlers at CleCap—or from one of the many efficient CleCap distributors.

Approximate Tensile Strength*
(Lbs. per Sq. In. Minimum)

Stock screws are double heat treated to SAE Grade 5 physical properties

Up to ¾" dia. inclusive	120,000
Over ¾" to 1" dia. inclusive	115,000
Over 1" to 1½" dia. inclusive	105,000

*Based on mean thread area.

The Cleveland Cap Screw Co.

2929 EAST 79th STREET • CLEVELAND 4, OHIO

VU Ican 3-3700 TWX CV42

Warehouses: Chicago • Philadelphia • New York • Providence • Los Angeles

CLEVELAND *Top Quality* FASTENERS

Ferrous and Non-Ferrous: Bright, High Carbon and Alloy Steel Heat Treated, Brass, Silicon Bronze, Stainless Steel

- Hex Head Cap Screws—¼" to 2½" dia.
- Socket Head Cap and Set Screws—Plain and Knurled: ¼" to 1½" dia. Also Flat and Button Head Styles
- Flat Head Cap Screws—¼" to 1" dia.
- Fillister Head—¼" to 1" dia.
- Set Screws—Square Head—¼" to 1¼" dia.
- Milled Studs—¼" to 1¼" dia.
- Place Bolts—¼" to 1½" dia.
- Structural Bolts to ASTM Specification A325
- Tractor Bolts
- Special Hot and Cold Headed Parts

Facilities to make larger diameters than listed

Ask Your Jobber for CleCap!

Originators of the Kaufman DOUBLE EXTRUSION Process

GREENLEE

special-purpose machines for profitable mass production

Master brake cylinder machined on above Greenlee Special Machine.

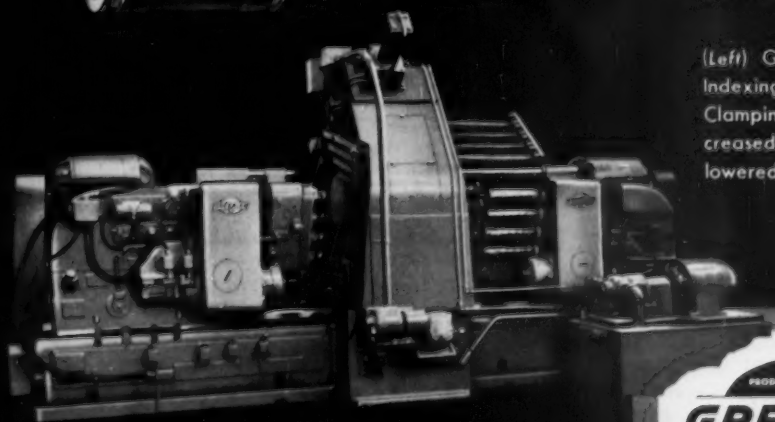
THEY SAVE WORK...THEY SAVE MONEY

If you are being outdistanced in today's swift race for production...faced with narrowing profit margins...it will pay to investigate Greenlee Special Machines. Savings effected on drilling, reaming, boring, counterboring and tapping operations will quickly amortize your invested dollars.

Wheel cylinder machined on Greenlee Special Machine shown below.

(*Above*) Greenlee Horizontal Indexing Machine designed for processing master brake cylinders has proved itself with raised quality and lowered costs.

(*Left*) Greenlee Two-Way Horizontal Indexing Machine equipped with Power Clamping and Automatic Unloading increased previous production rates and lowered costs.

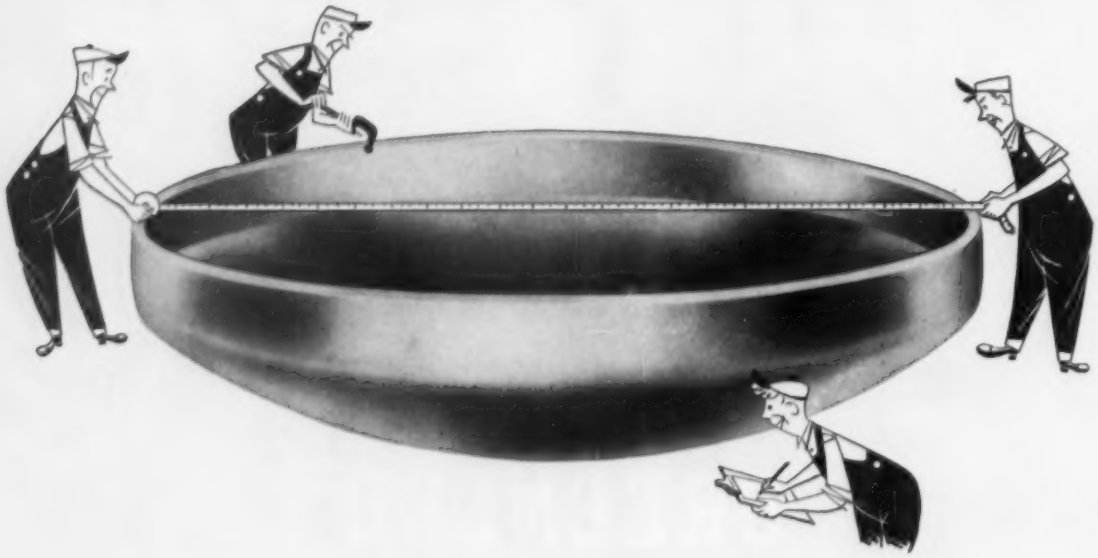


WRITE FOR COMPLETE INFORMATION

PRODUCTION MACHINERY
GREENLEE

GREENLEE BROS. & CO.
1812 MASON AVENUE
ROCKFORD, ILLINOIS

CLAYMONT HEADS



made to satisfy the most exacting specifications

Claymont Flanged and Dished Heads can be supplied to meet the specifications of the most exacting fabricator or user. That's because Claymont produces heads in a wide variety of sizes . . . from carbon, alloy, stainless-clad and Lectro-Clad Nickel Plated Steel as well as from non-ferrous metal supplied by our customers . . . and in two classifications:

CLAYMONT SPUN FLANGED AND DISHED HEADS in diameters up to 19 feet. They have long been the favorites of fabricators.

CLAYMONT PRESSED FLANGED AND DISHED HEADS are available in diameters up to 10 feet. Produced on modern equipment, including Claymont's new 3000-ton press, these heads are finding wide acceptance throughout the fabricating industry.

What's more, many of the more popular sizes and types of Claymont Flanged and Dished Heads are stocked throughout the nation in convenient CF&I warehouses. This assures prompt delivery of your head requirements and helps hold your inventory to a minimum.

We'll be happy to tell you how you can use Claymont Flanged and Dished Heads to best advantage in your own operations. There's no obligation on your part, of course, so why not contact us today? Write the nearest sales office or direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

CF&I *Claymont Steel Products*

3714

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Abilene • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles
New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
CANADIAN REPRESENTATIVES AT: Edmonton • Toronto • Vancouver • Winnipeg

OTHER CLAYMONT PRODUCTS

Carbon and Alloy Steel Plates • Manhole Fittings and Covers • Stainless-Clad Plates • Large Diameter Welded Steel Pipe
Flame Cut Steel Plate Shapes • CF&I Lectro-Clad Nickel Plated Steel

Now Puerto Rico Offers 100% Tax Exemption to New Industry

by BEARDSLEY RUML

"We don't want runaway industries" says Governor Muñoz. "But we do seek new and expanding industries." Federal taxes do not apply in Puerto Rico, and the Commonwealth also offers full exemption from local taxes. That is why 325 new plants have been located in Puerto Rico, protected by all the guarantees of the U.S. Constitution.

Beardsley Ruml

IN A dramatic bid to raise the standard of living in Puerto Rico, the Commonwealth Government is now offering U. S. manufacturers such overwhelming incentives that more than three hundred new factories have already been established in this sunny island 961 miles off the Florida coast.

First and most compelling incentive is the 100% tax exemption for most manufacturers who set up new plants in Puerto Rico.

For example, if your company is now making a net profit after taxes of $53,500, your net profit in Puerto Rico would be $100,000—a gain of 87 per cent, simply because Federal corporate income taxes do not apply in Puerto Rico and all local taxes are waived as well.

Your dividends in Puerto Rico from a corporation there could be $50,000 against $25,000 net in the U. S.—because Federal personal income taxes do not apply either.

What About Labor?

Puerto Rico's labor reservoir of 637,000 men and women has developed remarkable levels of productivity and efficiency—thanks, in part, to the Commonwealth's vocational training schools. These schools also offer special courses for managers and supervisors.

The progress made in technical skills may be gauged from the fact that there are now twenty-eight factories producing delicate electronic equipment.

Among the U.S. companies that have already set up manufacturing operations in Puerto Rico are Sylvania Electric, Carborundum Company, St. Regis Paper, Remington Rand, Univis Lens, Shoe Corporation of America, and Weston Electric.

CORPORATE TAX EXEMPTION

If your net profit after U. S. Corporate Income Tax is:	Your net profit in Puerto Rico would be:
$ 17,500	$ 25,000
29,500	50,000
53,500	100,000
245,500	500,000
485,500	1,000,000

DIVIDEND TAX EXEMPTION

If your income* after U. S. Individual Income Tax is:	Your net income in Puerto Rico would be:
$ 3,900	$ 5,000
7,360	10,000
10,270	15,000
14,850	25,000
23,180	50,000
32,680	100,000
43,180	200,000
70,180	500,000

*These examples are figured for dividends paid in Puerto Rico to a single resident. Based on Federal rates effective Jan. 1, 1954.

"Close to Paradise"

Listen to what L. H. Christensen, Vice President of St. Regis Paper, says:

"The climate is probably as close to paradise as man will ever see. I find Puerto Ricans in general extremely friendly, courteous and cooperative.

"This plant in Puerto Rico is one of our most efficient operations, in both quality and output. Our labor has responded well to all situations."

Mr. Christensen might have added that the temperature usually stays in the balmy 70's twelve months a year.

The swimming, sailing and fishing are out of this world. Your wife will rejoice to hear that domestic help is abundant.

The Commonwealth will leave no stone unturned to help you get started. It will build a factory for you. It will help you secure long-term financing. It will even screen job applicants for you—and then train them to operate your machines.

Transportation

Six steamship companies and five airlines operate regular services between Puerto Rico and the mainland. San Juan is just 5½ hours by air from New York.

Light-weight articles such as radar components come off the line in Puerto Rico one day and are delivered by air freight next day in Los Angeles, Chicago and other mainland cities. And, of course, there is no duty of any kind on trade with the mainland.

Are You Eligible?

Says Governor Muñoz: *Our drive is for new capital. Our slogan is not "move something old to Puerto Rico," but "start something new in Puerto Rico" or "expand in Puerto Rico."*

To get all the facts, and to find out whether you and your company would be eligible for complete tax exemption, telephone our nearest office.

New York	MU 8-2960	579 5th Ave.
Chicago	AN 3-4887	79 W. Monroe
Los Angeles	WE 1-1225	5525 Wilshire

OR MAIL COUPON

Commonwealth of Puerto Rico
Economic Development Administration
579 Fifth Ave., New York 17, N. Y.
Dept. IA-1

Mail me "Facts for Businessmen." I am interested in the advantages of Puerto Rico for the industry I have checked.

☐ Electronics ☐ Plastics ☐ Apparel
☐ Leather ☐ Optical ☐ Metals

Other _____

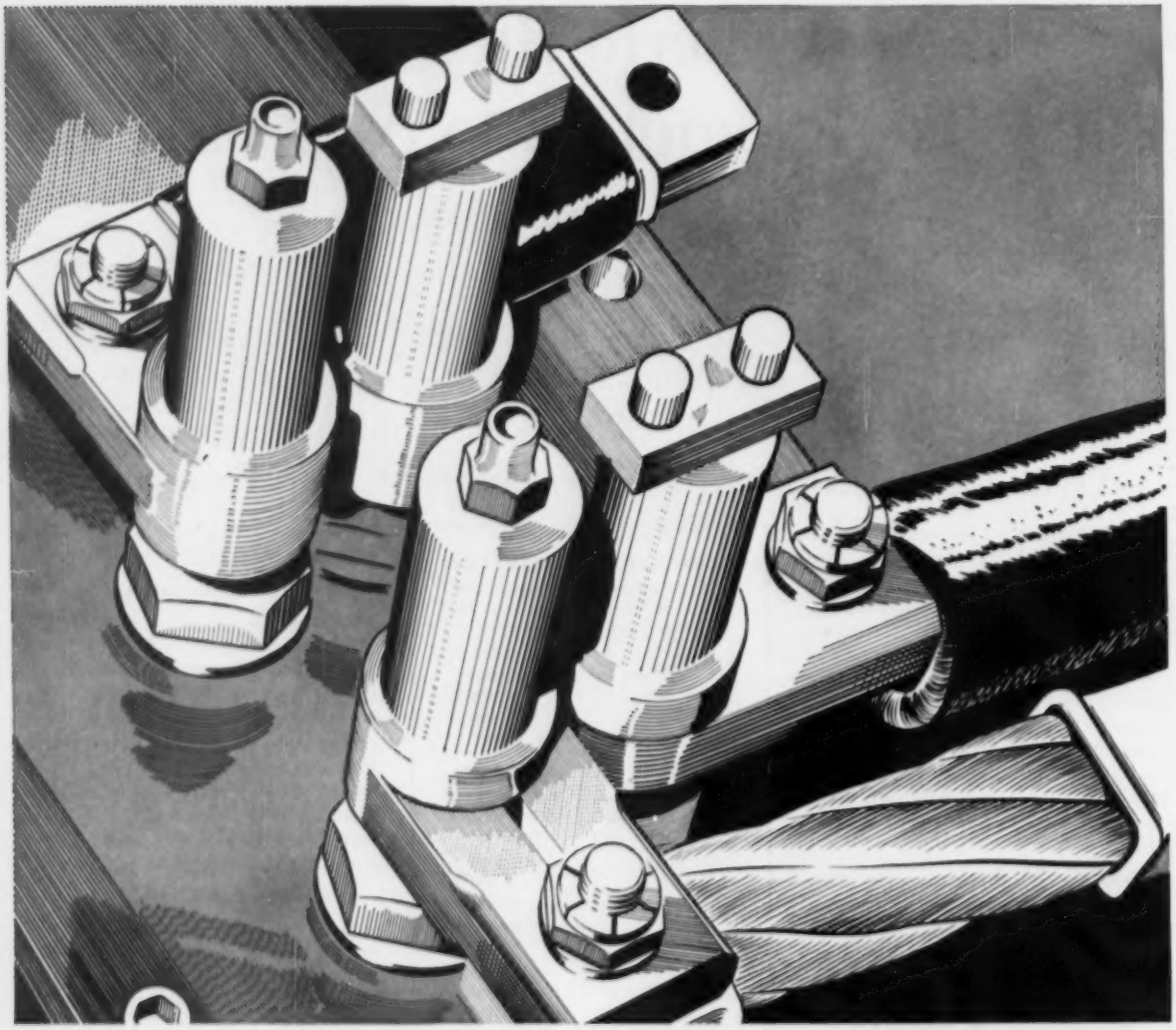
Name _____

Company _____

Address _____

_____

FLEXLOC AT WORK



DESIGNER OF WELDING DIE uses one-piece, all-metal thin FLEXLOCS as stop nuts on flexible cable assembly. Although the assembly swivels, FLEXLOCS won't work loose.

Nuts that loosen cause trouble. Contact is poor; flow of current erratic; welding faulty—and faulty welding means inferior finished jobs.

Don't take any chance of nuts loosening on vital assemblies. FLEXLOCS are made to stay put. And they are available in a wide range of sizes, types and material. See your authorized industrial distributor for Bulletin 866 and samples. Or write STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

• • •

Use FLEXLOCs anywhere safely

ON ROUGH BOLTS. They'll smooth out bolt threads without damaging the threads of the nut.

IN TEMPERATURES TO 550°F in plated nuts and even higher in unplated ones. High temperatures do not affect FLEXLOCS. Nuts with non-metallic inserts fail under such conditions.

AS STOP OR LOCK NUTS. After at least 1½ threads of a standard bolt are past the top of the nut, the FLEXLOC stays put.

REGARDLESS OF MOISTURE, OIL, DIRT OR GRIT. None of these conditions make any difference to a FLEXLOC, and vibration won't loosen it.

FLEXLOC®
LOCKNUT DIVISION
sps
JENKINTOWN PENNSYLVANIA

Do it
Faster for less with

RELIANCE SNAP RINGS

on shaft, in bearing and
in counterbore applications

Immediate savings in production costs are made by switching from the old shoulder machining method to Reliance Snap Rings. The old method made it necessary to machine the entire length of an oversized shaft to form a shoulder. Now it can be done simply and easily by milling a groove and snapping in a Reliance Ring on a standard size shaft. Machining time, money and material are saved at no sacrifice in product quality or performance. Wherever you are mounting gears or bearings, consider the cost reducing features of Reliance Snap Bearing, Lock and Retainer Rings. You can't lose anything and may save a lot. Write for free Engineering Bulletin 4K3.

RELIANCE DIVISION EATON® MANUFACTURING COMPANY

OFFICE and PLANTS: 550 Charles Ave., MASSILLON, OHIO

Springitites & Seems | Snap & Retaining Rings | Special Steels | Spring Lock Washers | Hos-Fas-Ners

SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

In the good old days

When the "Silver Campaign Depression" made it difficult to feed our horse, let alone meet the company payroll

when kitchen stoves were cast iron — and we made stove plate castings . . . when our first ads appeared in such well known magazines as:

HORSELESS AGE
AMERICAN MANUFACTURING
MODERN MACHINERY
THE GAS ENGINEER BULLETIN

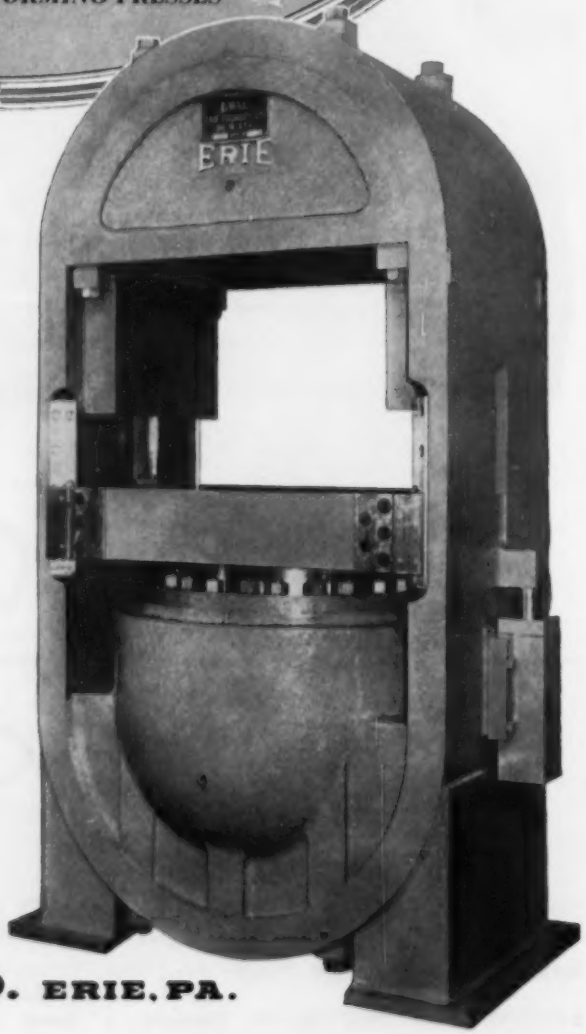
ERIE FOUNDRY WAS A GREAT NAME IN SPECIAL METAL-FORMING PRESSES

in today's modern metal working shop

When high labor costs mean more production per machine per hour to make a profit . . .

When exerting tremendous forces means faster shaping of metals . . .

When minimum deflection (less than .002") means almost perfect die matching . . . perfect parts . . .



"IN OUR 60TH YEAR"

ERIE

is still the greatest name in special hydraulic metal-forming presses

ERIE FOUNDRY CO. ERIE, PA.

why you should put SUPERFINISH in your blueprints

Longer life, better performance—yes, and *lower costs, too*—should be engineered into the product at the start. For example: when you specify Gisholt SUPERFINISH, you accomplish two things: First, you assure a bearing surface free of the imperfections that cause wear—a surface that will last indefinitely. Second, you cut the cost of grinding—or even eliminate it. Surprisingly enough, you can in most cases achieve this superlative finish at lower over-all cost than is possible with other methods of finishing.

WRITE TODAY FOR YOUR FREE COPY

You'll be interested in this graphic explanation of SUPERFINISHING—exactly how it cures problems of annealed smear metal, surface fragmentation and surface irregularities. Fully illustrated. Use coupon.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

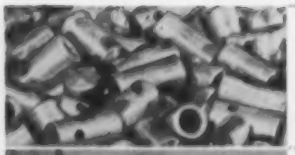
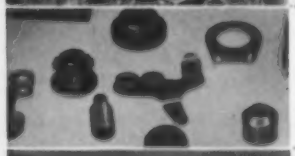
Gisholt Machine Company
Madison 10, Wisconsin
Gentlemen:
Please send my free copy of "Superfinishers," Form 1169.

Name.....*Title*.....
Company.....
Street Address.....
City.....*State*.....

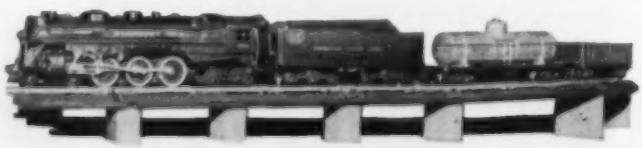
TURRET LATHES • AUTOMATIC LATHES
SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Can a Steam Atmosphere Furnace Save You Money?

There's a good chance it can if you heat treat any of a wide variety of ferrous parts. Here's a check list to show you why.

	PRODUCT	MATERIAL	ADVANTAGE
	Cams, bearings, valve tappets, pistons, piston rings, etc.	Cast iron	Wear resistance improves
	Twist drills, taps, punches, reamers, counter bores, etc.	High-speed tool steel	Tool life increased
	Saw blades, machine parts	Steel	Improved bonding surface for paint or lacquer prevents chipping and cracking
	Business machine, sewing machine, gun parts, bolts	Steel	Clean, safe, cheap method of blueing
	Bearings, bushings, pistons, toy parts, etc.	Powdered iron	Hardness and compressive strength improved

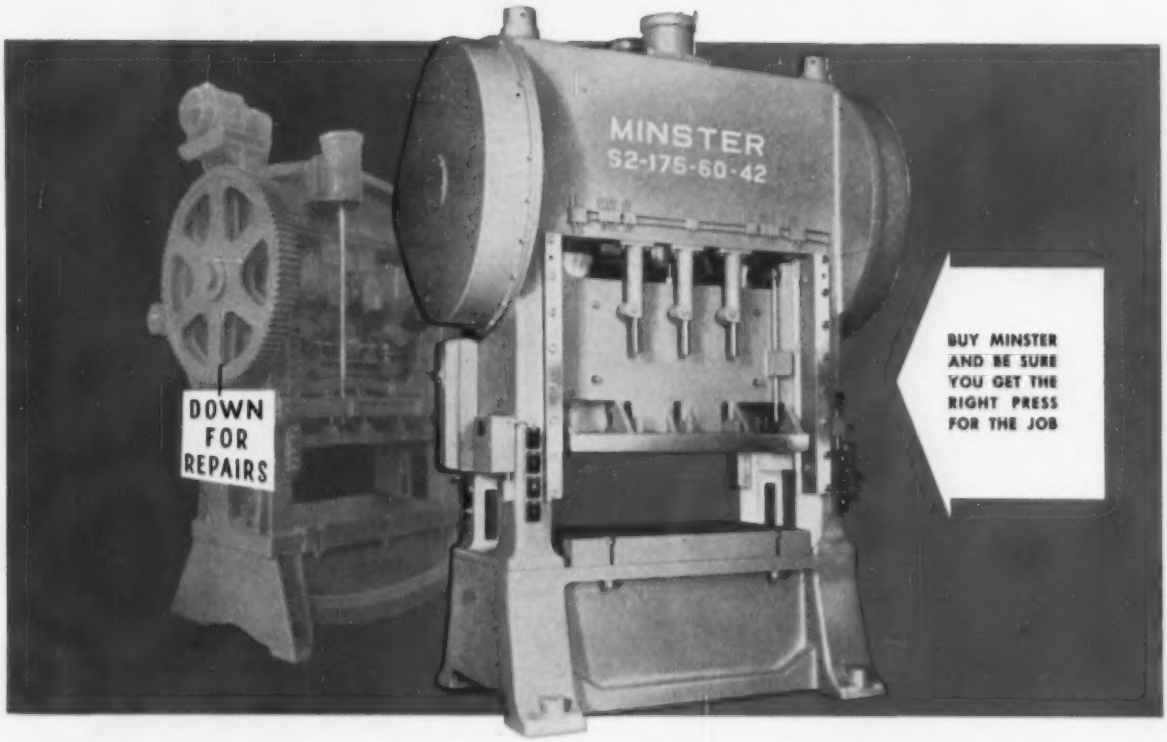
A. C. Gilbert Co. inexpensively achieve that uniform, wear resistant, blue-black finish on the undercarriages of scale-model trains by heat treating in an L&N Steam Homo furnace.



Complete equipment for steam atmosphere heat treating consists of a Steam Homo R furnace and L&N temperature control panel. Both furnace and instrument panel are shipped completely assembled ready for installation in your production line. Furnaces are available in a variety of sizes to suit your particular application. For complete information just write us at 4956 Stenton Ave., Phila. 44, Pa., and ask for Catalog TD2-620.

LEEDS & NORTHRUP
instruments — automatic controls • furnaces

A Minster Press means
LESS DOWNTIME



Here is why Minster Presses on the job mean more production hours and less downtime for press repair!

1 ADVANCED DESIGN to give you the value of the best practices and latest improvements in presses . . . Box type construction for less deflection and better bearing support . . . Slides having longer ways fully supported and widely spaced . . . Large diameter connection screws . . . Method of taking up wear in lower connection bushings . . . Barrel slide adjustment on all sizes over 60 ton.
Clutch controls, both air and electrical, to improve press operation and production methods.

2 MINSTER'S PATENTED COMBINATION FRICTION CLUTCH AND BRAKE . . . One single automatically synchronized unit having air engaged multiple disc clutch and spring applied brake . . . Fast controlled engagement or disengagement at any point on 360° surfaces . . . Shock absorbing action . . . Exceptional friction surface life. *No more sledge hammer engagement, fast wearing and hard to fit replacement parts.*

3 PRECISION FITTING where it counts . . . Ways scraped to master gauges and square to the slide face . . . Bed scraped to surface plate . . . Bearing bores and bushings honed to fit . . . Ground spacers for maintaining proper gib clearance . . . Ground and roll burnished crankshafts.

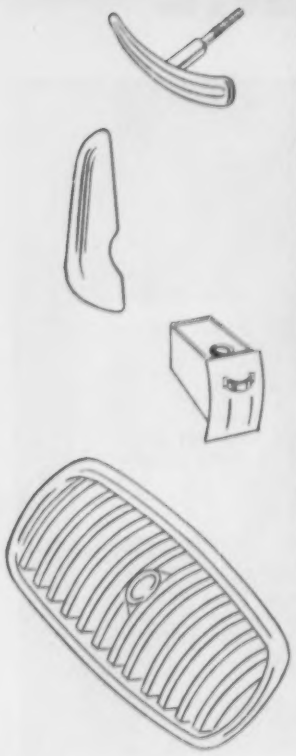
4 MAINTENANCE INFORMATION AND OPERATOR INSTRUCTION applying to your press . . . A guide to preventive maintenance and operator training.

Let Minster help you plan your press replacement program

THE MINSTER MACHINE COMPANY
MINSTER, OHIO

MINSTER®
PRESSES

Another field report on "TRICLENE"® D



BUMPER GUARDS being loaded into roller conveyor degreaser at Grand Rapids Metalcraft by worker Ben Kolenda.

THOROUGHLY CLEANED with TRICLENE D, bright bumper guards are removed at end of degreaser by James Holliday.

"TRICLENE® D makes vapor degreasing easier than ever . . . now we can put through a larger volume of work,"

Says C. Nesselroad, Mgr., Grand Rapids Metalcraft, Division F. L. Jacobs Co., Grand Rapids, Mich.

"We operate six degreasers—two manual and four conveyorized," continues Mr. Nesselroad, "and since we turn out as many as 150,000 parts per day, we've found we just can't *afford* to have trouble."

That's why Grand Rapids Metalcraft uses TRICLENE D trichlorethylene. With this rugged solvent, they've had consistently thorough, trouble-free degreasing of the automotive stampings they manufacture—bumper guards, brackets, ash trays and grill parts. And with TRICLENE D, their volume of work handled has shown an *increase* . . . and maintenance costs have *decreased*. Furthermore, Mr. Nesselroad concludes, "We've never found a degreasing job that TRICLENE D trichlorethylene couldn't do!"

Locked-in stabilizers give TRICLENE D unsurpassed resistance to *all* major causes of solvent deterioration—heat, light, air, acids and aluminum chloride—yet this rugged solvent contains nothing to harm even delicately machined metal surfaces. TRICLENE D retains its original high purity longer . . . continues to give *brighter cleaning of any metal* job after job, distillation after distillation. And remember, it costs no more!

FOR MORE INFORMATION on TRICLENE D and how it can bring a new standard of efficiency to your vapor degreasing operation, write our nearest District Office. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

TRICLENE® D

TRICHLORETHYLENE

High production Sciaky resistance welding joins

TEN THOUSAND UNITS WITH LESS THAN 1% SCRAP FACTOR

Other methods of fabricating Double-Sinks FAIL!

How old is "antique"? ...with resistance welders it may be only five years because of recent Sciaky technical achievement.

Production limitations and high operating cost make these antiques "expensive." You can't be competitive if your product won't let you compete!

Within ten days of delivery, one Sciaky mash welder with an inexperienced operator joined 10,000 sink units with less than 1% scrap factor for Southern Porcelain in Dallas, Texas. Not only quality and production beyond expectation, but metal finishing operations were minimized.

For almost a year Southern Porcelain unsuccessfully tried every conceivable method to join two 14 gauge Armco deep drawn steel sink units to fabricate a double-sink. Reject rates ran high because porcelain finishing demanded a strong, smooth, non-porous joint.

The relatively simple solution to this problem is actually the product of Sciaky's basic philosophy in design—resistance welding to do *more useful work* at *lowest operating cost* with *maximum reliability*.

You can read all the details of this interesting application *free*—send your name and title on company letterhead for your copy of "Resistance Welding At Work", Vol. 4—#6.

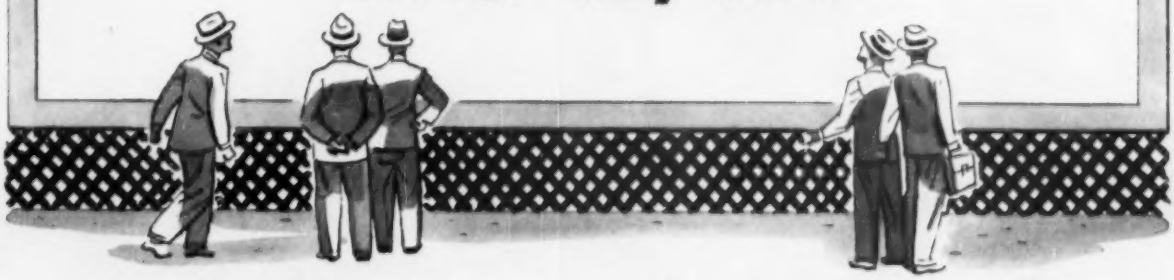
Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY®

Sciaky Bros., Inc., 4910 West 67th Street, Chicago 38, Ill., Portsmouth 7-5600

SIMPLEX Ferrochrome

the most economical grade of low-carbon ferrochrome ...for any use



Are you taking advantage of the savings possible with ELECTROMET'S SIMPLEX Ferrochrome?

Less than 0.01% Carbon

ANALYSIS	"SIMPLEX" NO. 1 ALLOY	"SIMPLEX" NO. 2 ALLOY
Chromium	63 to 66%	63 to 66%
Silicon	5 to 7%	max. 1.00%
Carbon	max. 0.010 or 0.025%	max. 0.025%

"Simplex" No. 1 alloy with 0.025 per cent carbon max. and "Simplex" No. 2 alloy are available in nitrogen-bearing grades containing 2 per cent or 5 per cent nitrogen.

CHECK THESE ADVANTAGES:

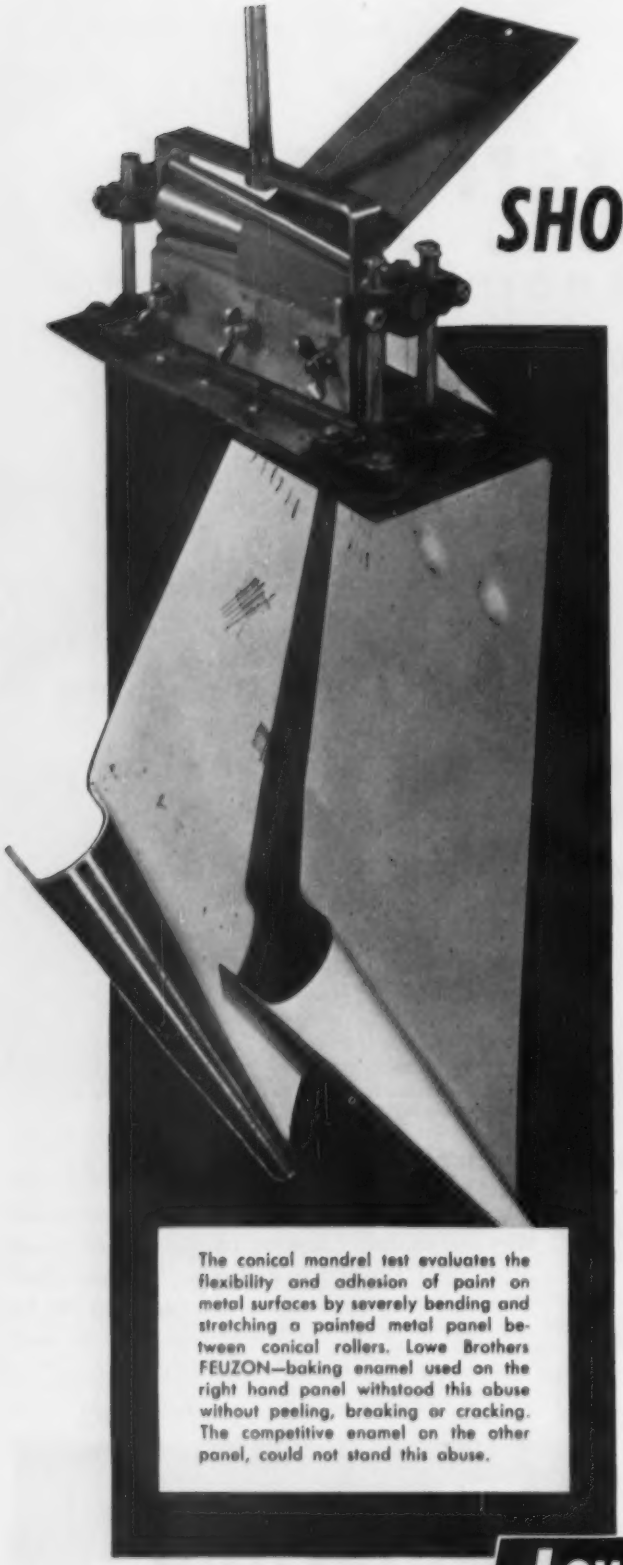
- ☑ ELECTROMET's "Simplex" alloy is the lowest priced low-carbon ferrochrome.
- ☑ The carbon content is extremely low.
- ☑ The alloy is suitable for producing all grades of stainless steel.

For additional information please contact the nearest ELECTROMET office. Ask for the ELECTROMET booklets entitled, "Melting Low-Carbon Stainless Steel" and "Reducing Period in Stainless Steel Melting." They show the advantages that can be obtained in producing low-carbon stainless steel with "Simplex" ferrochrome.

The terms "Electromet" and "Simplex" are registered trade-marks of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
OFFICES: Birmingham • Chicago • Cleveland • Detroit
Houston • Los Angeles • New York • Pittsburgh • San Francisco
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

Electromet
TRADE MARK
Ferro-Alloys and Metals



The conical mandrel test evaluates the flexibility and adhesion of paint on metal surfaces by severely bending and stretching a painted metal panel between conical rollers. Lowe Brothers FEUZON—baking enamel used on the right hand panel withstood this abuse without peeling, breaking or cracking. The competitive enamel on the other panel, could not stand this abuse.

SHOCK TREATMENT

..bad medicine for the wrong finish

You can't afford to use anything but the right finish. The second best might be cheaper and look just as good, but it will be more costly in the long run.

The "shock" will come after your product goes into home, office or plant. The finish must not only look good but also be able to take wear and abuse.

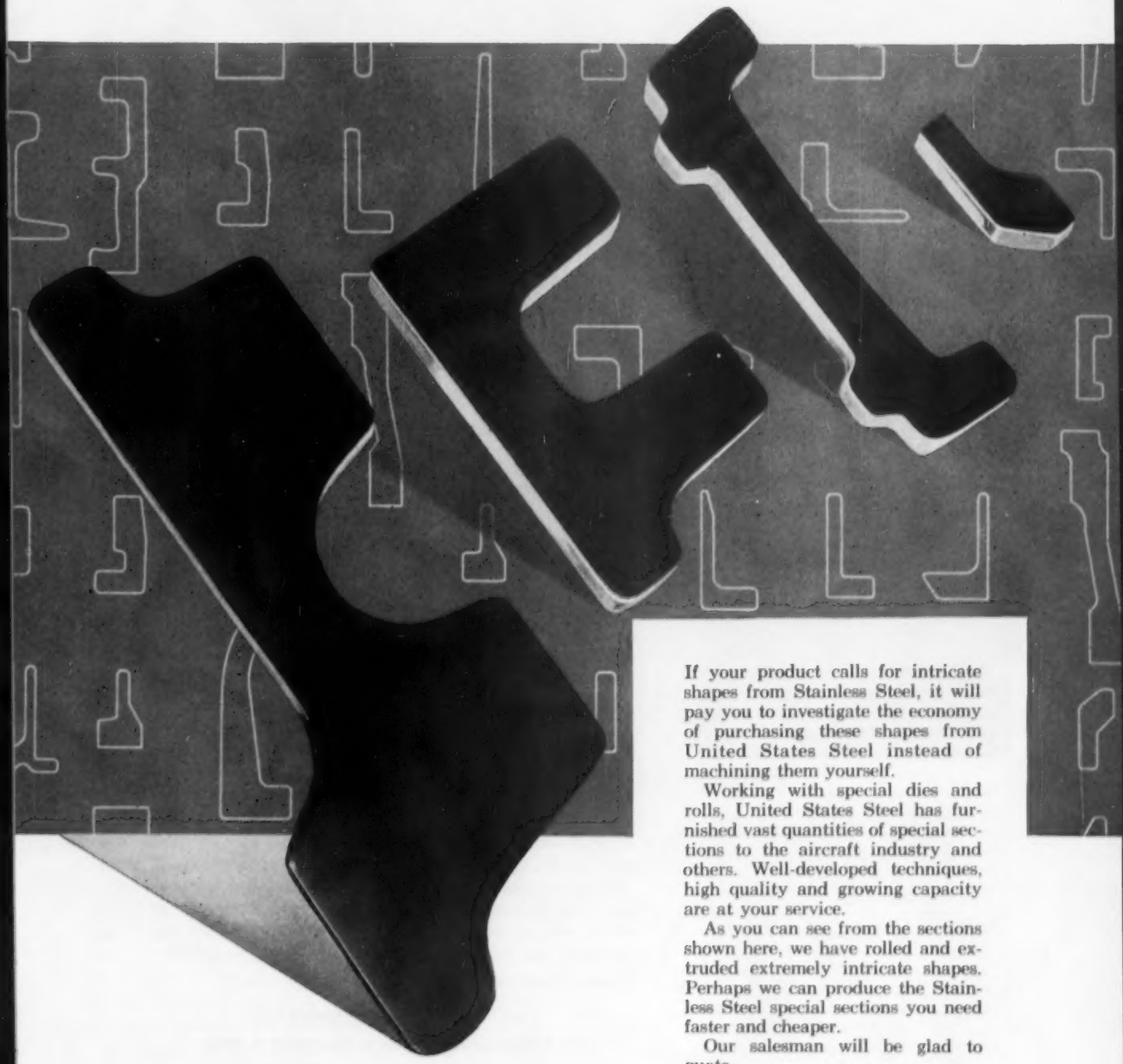
The "shock treatment," more severe than any encountered in actual service, is simulated in Lowe Brothers Technical Service Laboratory to determine in advance the reliability of each finish. The two test panels at the left which have been bent and stretched, graphically emphasize that the best paint is the most economical finish in the long run.

To make sure you get the right finish everytime, call or write Lowe Brothers Company, 424 East Third Street, Dayton 2, Ohio.

LOWE BROTHERS
INDUSTRIAL FINISHES

also Style-Tested paints for the home

You can save machining costs with special sections–rolled or extruded of **USS STAINLESS STEEL**



If your product calls for intricate shapes from Stainless Steel, it will pay you to investigate the economy of purchasing these shapes from United States Steel instead of machining them yourself.

Working with special dies and rolls, United States Steel has furnished vast quantities of special sections to the aircraft industry and others. Well-developed techniques, high quality and growing capacity are at your service.

As you can see from the sections shown here, we have rolled and extruded extremely intricate shapes. Perhaps we can produce the Stainless Steel special sections you need faster and cheaper.

Our salesman will be glad to quote.

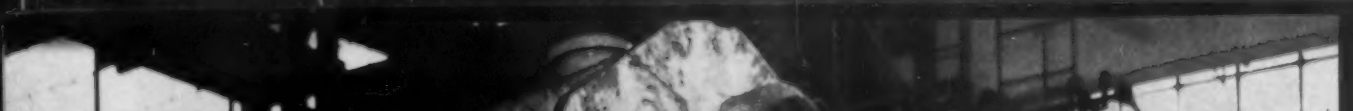
USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL CORPORATION, PITTSBURGH
AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION,
WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL



1001 things now being done by

COLD-ROLL FORMING

As your production requirements grow, new opportunities for effecting economies are offered by cold roll forming components. A few applications are illustrated here: The structural parts of the new Giant 74-ton Boeing Stratofreighter KC-97G are, as in most other planes, made almost entirely from cold-roll-formed shapes because of their high strength-weight ratio.

In the modern warehouse shown at left, the steel decking and rolling steel doors were cold roll formed and installed by the R. C. Mahon Company, Detroit, Michigan.

In the photo of an Armstrong furnace below, the arrows point to the jacket rings and two pilasters framing the front openings—all cold roll formed at a big saving compared with previous methods.

The new Yoder book on Cold Roll Forming is an illustrated story of many of the things which are made lighter, stronger and more accurately by this process than by any other, yet at greatly reduced cost. It is also a complete textbook on the machines, their tooling, operation, and economic possibilities.

A copy is yours for the asking.

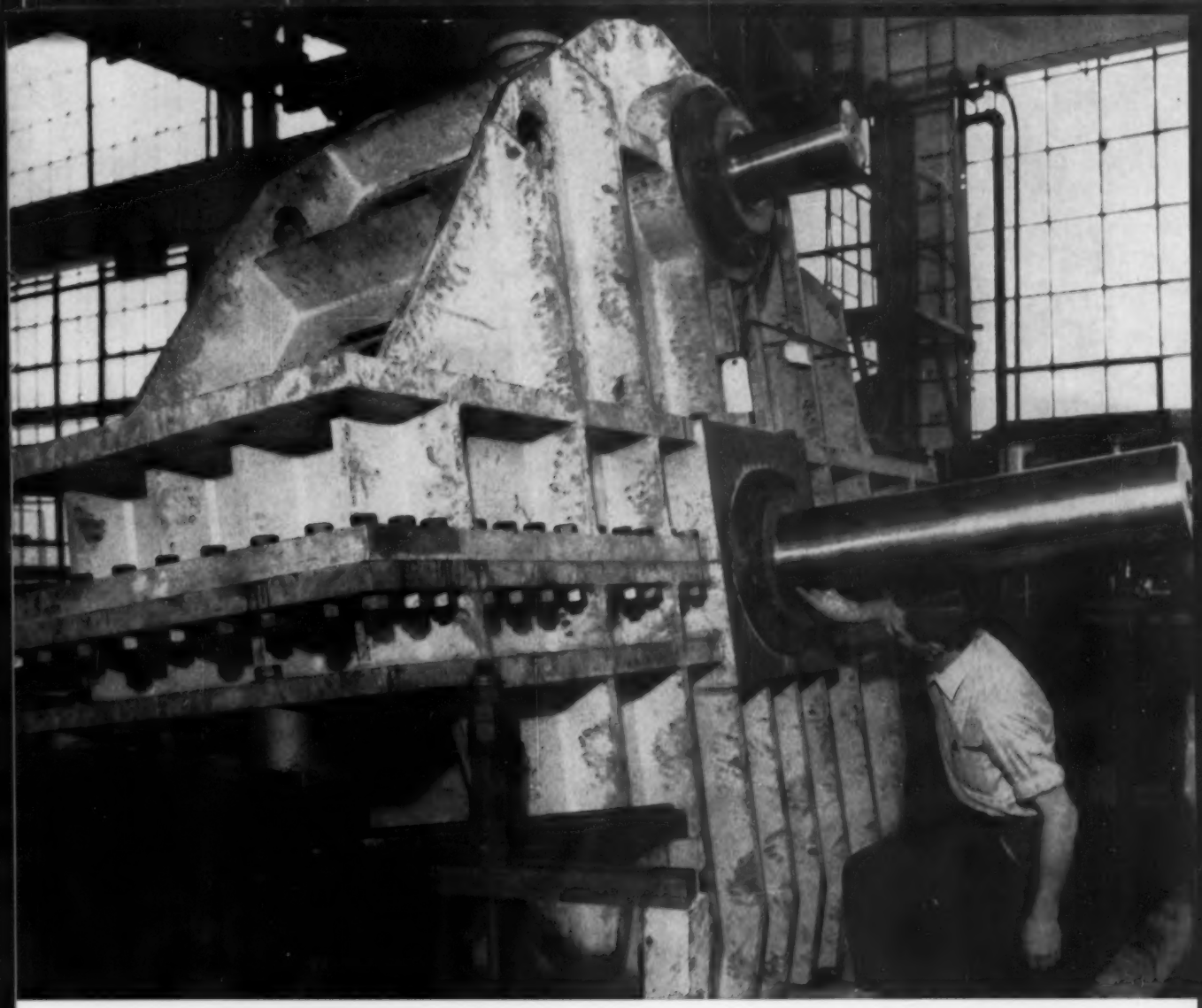
THE YODER COMPANY
5510 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

- COLD-ROLL-FORMING and auxiliary machinery
- GANG SLITTING LINES for Coils and Sheets
- PIPE and TUBE MILLS—cold forming and welding

ENGINEERING YODER MANUFACTURING

UNITED STATES STEEL



Westinghouse Gearing Division improves speed reducer performance with SSW forged steel shafts

Two Standard Steel forged steel shafts are important components of this speed reduction unit required to drive a seamless tube piercing mill. Built and set up for tests by the Gearing Division of Westinghouse Electric Corporation, Pittsburgh, SSW shafts (output and input) were selected for their more uniform *internal structure and closely controlled analysis.* They know these inherent features will contribute to higher-quality . . . longer-lasting . . . failure-resisting performance.

Westinghouse also found this structural uniformity enabled them to machine finish on site the high-speed output shaft simply and easily.

You too can improve your product, get better over-all performance and operation by specifying and standardizing on Standard Steel forgings.

Dept. 8616, Standard Steel Works Division
Baldwin-Lima-Hamilton Corporation, Burnham, Pa.

Please send me new Standard Steel Works folder containing detailed information on "How forged weldless rings and flanges improve your product and cut your costs."

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

BALDWIN BLH LIMA-HAMILTON

Standard Steel Works Division

BALDWIN-LIMA-HAMILTON

It Costs No More To Give More—
If You Give The Bonus In Savings Bonds!

If your company is one of the more than 45,000 companies that have the Payroll Savings Plan you *know* what your employees think of Savings Bonds — they spell it out for you every month in their Savings Bond allotments.

If you don't have the Payroll Savings Plan, and are wondering whether your people would like to receive their bonus in Bonds, here are a few significant facts:

—every month, *before they get their pay checks* or *envelopes*—8,500,000 men and women enrolled in the Payroll Savings Plan invest $160,000,000 in U. S. Savings Bonds.

—Payroll Savers hold their Bonds: From May 1, 1951, to September 30, 1955, approximately $13.7 billion E Bonds reached 10-year maturity dates. On September 30, 1955, approximately 70.3% of the matured bonds were retained by their owners under the automatic extension plan. With additional interest earned since maturity dates ($560 million), cash value of the matured bonds held by individuals amounts to approximately $13.7 billion.

—on September 30, 1955, the cash value of Series E and H Bonds—the kind sold only to individuals—totaled 39.7 billion dollars, a new high.

To the Payroll Saver, and to the man who buys his Bonds at a bank (because his company does not provide the Payroll Savings Plan) a One Hundred Dollar Savings Bond looks bigger and better and *is* bigger and better, than a check for $75. *Make this a merrier Christmas for every employee. Give the gift that keeps on giving.*

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

the **Iron Age**

"THAT'S OUR STEEL STOCKROOM"

The gentleman is referring to the Carpenter Mill-Branch Warehouse in his locality. Have you ever thought about making your nearest Carpenter Warehouse *your* steel stockroom, too?

When you do, you'll make the profitable discovery that your Carpenter Mill-Branch Warehouse not only carries stocks of specialty steels . . . but puts at your command one of the most comprehensive services on steel ever devised.

And *every* service is designed to free you from more of your steel problems . . . lets you concentrate on your one important job of making *more* and *better* products at a lower unit cost.

There's the man on the warehouse order desk ready to give quick information on sizes, prices and grades. There's professional in-the-shop help on tooling and production problems . . . service literature to help you get the most from every pound of steel you use . . . as well as Metallurgical Counsel available to you direct from the Reading Mill.

Give your nearest Carpenter Mill-Branch Warehouse or Distributor a chance to prove how this comprehensive Mill-Branch Warehouse Service can pay off for you. Simply pick up your phone, call the number and be ready for action! The Carpenter Steel Co., 121 West Bern St., Reading, Pa.

Carpenter STEEL — Mill-Branch Warehouse Service

SPECIALTY TOOL • ALLOY and STAINLESS STEELS

The Iron Age Newsfront

Mill Equipment Backlogs Soar

If you're thinking of ordering new steel mill equipment—better move fast. The second round of postwar steel expansion is jamming order books of steel mill equipment makers—pushing delivery dates further and further back.

Defense Dept. Bones Up On Production

Procurement officials in the Defense Department are scheduling a set of round-table talks with firms engaged in defense work or capable of taking it on. The Pentagon wants to make sure it is keeping up with the latest wrinkles in production techniques.

Takes Guesswork Out Of Tempering

Some of the guesswork has at last been eliminated from the steel heat-treater's age-old problem of choosing the right tempering temperature and time at temperature to produce a desired hardness. A new method, based on extensive testing of popular structural grades, gives a quick, close estimate of tempered hardness for steels of known composition.

Team Up On Research Reactors

There's a definite acceleration of interest in cooperative industrial underwriting of the cost of building research reactors. At least three team projects—one involving more than 15 companies —are now in the planning stage. Companies are turning to share-the-cost reactors to see what they can do for them before undertaking the enormous cost of private building.

Cold Heading Wire Market Tightens

Buyers of cold heading quality wire are watching the grade carefully. Though present deliveries are good, buyers of the grade are covering themselves through the second quarter of '56 where the mills will allow it. In some cases, coverage has been extended to as much as 100 pct of expected second quarter needs.

Closer Look At Automation

Informed Detroit processing engineers now believe that automation has been overdone in some instances. There have been some costly failures as well as partially successful installations. It is expected that cost and other factors will be evaluated even more closely in the future. Reliable reports state that a go-slow order for 1956 has already been given by a major car producer.

Raise Electrical Equipment Prices?

Look for a general price increase in heavy electrical equipment for utilities and industry in the first half of next year. Following "white sales" in turbines, generators and transformers early this year, builders have full schedules and are out to reverse the highly competitive trend of the past few years.

Forge Hammer Well Insulated

A recently installed 18,000-lb forge hammer is so well shock-insulated that two banks of instruments for heat-treating and forging are located within 20 ft. The hammer is designed for both open and closed die work.

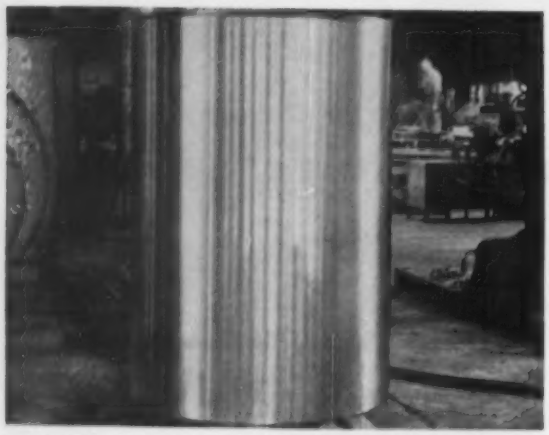
Buyers Go For Small Al Ingot

Development of a pint-sized aluminum ingot for smaller extrusion plants is proving a major windfall for one midwest aluminum forging plant. Ingots measuring 5⅛ in. diam are snapped up for extrusion presses turning out a wide variety of small shapes. Production of the ingots is now running two million lb monthly.

Trucks Up Use of Tubeless Tires

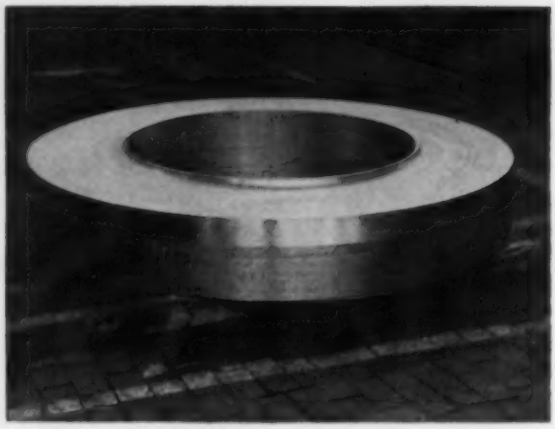
Tubeless truck tires may advance to as much as 70 pct of total truck tire sales by second quarter 1956. Tubeless tires for earth-moving equipment are also a prospect for the near future. For the trucking industry, the larger tubeless tires mean bigger payloads.

MIDVALE FORGES *SLEEVE* TO STRENGTHEN AIR FORCE ARM



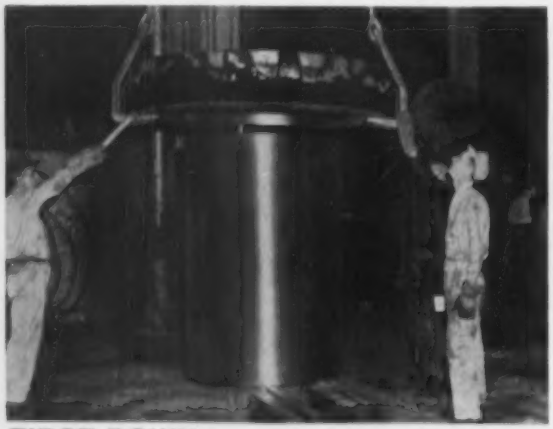
FORGED AND MACHINED SLEEVE

. . . for use in a Loewy-Hydropress 8,000-ton extrusion press for producing aluminum aircraft sections . . . has a length of 65″ and a 45¾″ O. D. A forged liner has been precision machined for an exact fit into its 25″ bore.



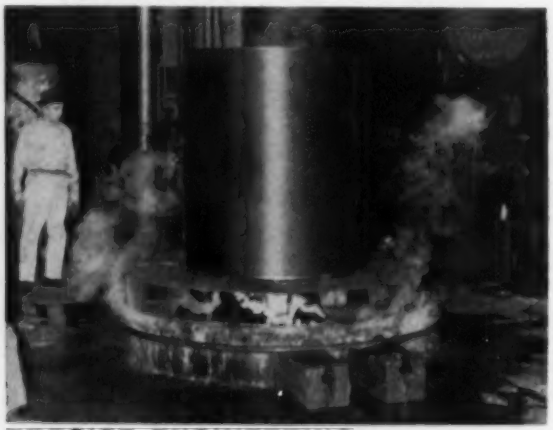
AN OUTER RING

. . . the first of five, which have been forged, machined, heat treated and inspected. All will be shrunk on the sleeve, after accurate checks have been made in position, along and around the periphery.



FIRST DOWN

. . . or at least on the way . . . with four more to go. Each ring is 76-1/16″ O. D. and 13″ across the face. Inspected for dimensional accuracy and machine finish . . . checked for tensile strength and hardness . . . subjected to 100% Sonic test.



PRECISE ENGINEERING AND MACHINING

. . . needed for shrink-fit, which must be tight enough to withstand operating pressures, but not tight enough to crack under any stresses set up by cooling of the ring. Each of the five rings present the same problem.

The photographs above are indicative on only a few of the extensive facilities and skills developed at Midvale during the past ninety years. The same productive know-how is utilized for forging shells, rolls, shafts, flanges, pressure vessels . . . in carbon, alloy or stainless steel . . . or in producing corrosion and heat resisting castings. Your job is not too small . . . nor too big for Midvale. Call us for a quotation on your next order.

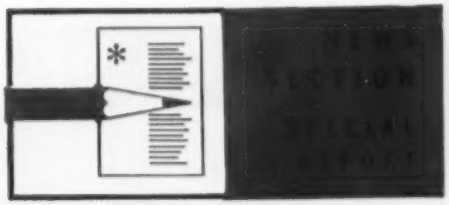
THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, STAINLESS STEEL CASTINGS

TOY TRAINS accounted for 5 pct of U.S. toys 'dollar volume.'



TOYS: Christmas Comes Once

Toy industry heads for billion dollar year . . . Metal models lead the way . . . But heavy reliance on Christmas sales creates production, financial woes—By G. *McManus.*

◆ SERIOUS MEN stream in and out of a building at 200 Fifth Ave. in New York. They ask themselves and each other strange questions.

"Should the dragon's tail wiggle?" "Should the train go choo-choo?"

These are the toymakers. Hundreds of them have offices in or around the Fifth Avenue building. Their questions are big ones in a big, important industry.

Two Months to Sell

Retail sales of American toys will go over the billion dollar mark this year. And something like 60 pct of the buying is done in two months — November and December.

Over 86 million metal toys will be sold. This is one-third of the total and about 30 million more than the second largest group—plastics.

With a whole industry geared to this brief selling period, the action is fast and decisive. Toy manufacturers work under a brutal burden of being right the first time.

New toy lines are presented to the trade at the Toy Fair in New York each March, nine months ahead of the big selling season. Prior to this time, manufacturers and the big buyers have been feeling each other out. Buyers call at plants, make comments on models, indicate preference.

But the Fair really starts things. Electrical, hardware and toy wholesalers join with department store, chain and mail order buyers in viewing hand-made models. About 25 pct of the year's business is written up there.

Production Starts

Production of old standby models gets rolling in March. Shipments start going out in April.

On brand new models, production and shipments begin moving in June—provided the model has been accepted.

Tooling Expensive

If a new toy doesn't sell, development money goes down the drain. And Ideal Toy Corp. in New York estimates it takes two years and $100,000 to create a new toy.

Cost may be higher if a company has gambled on production tools and materials. To make a toy truck, suitable for riding by a child, F. C. Castelli Co. in Philadelphia uses about 60 stamping and forming dies. Special production machines and jigs could add to this expense.

Toy makers must gamble and prepare in advance to be in position to cash in on a hot item. American Metal Specialties Corp. in Hatboro, Pa., came out with a toy shopping cart last year.

The cart went over big. Amsco did well with the item. But the company could have sold at least

twice as many if it had scheduled production at a higher level.

Moreover, the big payoff comes when a new idea first clicks. Flashiest selling item this year already has five competitive imitations.

Production and shipping go full blast during the summer. Production begins to taper off in September. Most manufacturers wind up shipments in early November. In a good year like this one, the periods will drag out some. Department stores, which tend to buy late, will come in with last minute rush orders.

Spend $1 Billion

But generally speaking, the manufacturing season has ended by November and the selling season has begun. Christmas shoppers will put out a cool $955 million for toys this year. Their sudden spree will bring the number of metal toys sold to over 86 million, 30 pct of all sales and 36 million more than the second place group—plastics.

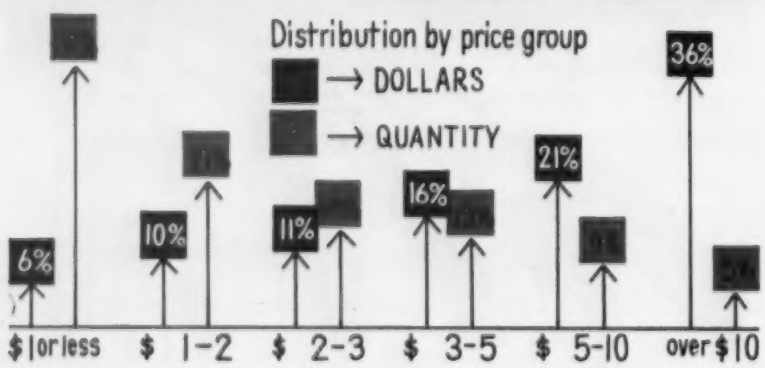
During all this activity, things are quiet around the toy plant. There is a certain amount of tidying up to be done. Next year's line must be engineered. At least four hand models must be made—for early viewing by buyers, for showing at the fair and for subsequent circulation among wholesalers.

But this isn't enough to keep a full staff busy. Some plants practically shut down during the winter months. Other makers diversify or turn to subcontracting.

Some Diversify

To modify an employment swing that runs from 350 during the June-September season to about 200 in the winter, F. C. Castelli has come up with a line of adult metal furniture. The company recently handled a big order of hydrogen bomb parts but hopes the furniture line will eliminate job work.

Where the Toy Dollar Goes



Amsco is making lamp assemblies on a subcontract basis to ease a job swing of from 700 to around 250 men. Amsco shies away from a separate product line because of the distinct marketing organization required.

The larger manufacturers of metal toys are well equipped for diversification and subcontracting. They make dies and jigs in their own tool shops. They have the standard fabricating machines. They cut, stamp, form, bend and roll. They weld, paint and package. Another fortunate circumstance: Metal toys are generally more stable market items than the novelties and knickknacks. Davy Crockett may come and go but electric trains, toy cribs, wagons and pedal trucks always have a certain market.

This stability enables a firm like Lionel to get away from the normal trade patterns to a certain extent. Production employment (with some diversification) stays at a fairly level 2200. Firm orders come in early. Next year's production starts sooner.

The toy industry is working toward a little more stability, particularly in the metals end. But seasonal selling has one gimmick no one has been able to lick. "We work for the banks in this business," said one manufacturer.

Must Ship Early

What he means is this: The toymaker can't store a whole year's production until it's needed in the fall. So he ships "as ready" from April and June on and lets the wholesaler delay payment until October.

Eighty pct of toy billing is on this dating basis. But at the other end of the toymaking line, ground rules are different. A manufacturer orders steel (over 110,000 tons go into toys) three months ahead to get delivery. He discounts his bills because it's good form. In the period between cash disbursals and cash receipts, he borrows money to stay alive.

Tough Bargaining

Department stores pay cash but they may ask anticipation discounts. Like all others in toyland, they are acutely price conscious.

And price is what the traffic will bear. A toy manufacturer, a veteran of straight industrial work, told of a case where a large toy sold at retail for less than the cost of the material in it.

He pictures the operations this way: "When I was dealing with engineers and plant people, it was a question of value. They knew what it cost me to make a piece. If I had figured too low, they'd have told me I way crazy. With toys, it's all bargaining. I name a price, he names a price and we bargain."

If all this doesn't make life interesting enough for the toy manufacturer, he has the added problem of light-fingered competition. "If you just think of an idea, they'll grab it," said one toyman.

Top Secret

Patent protection isn't taken too seriously in the toy trade. It's practically impossible to get an injunction while an infringement action is pending. And by the time a ruling is handed down, the idea may have been milked of its popularity and the imitator moved to another loft.

The only answer is to keep new toys from prying eyes. At Amsco the minutes of meeting are burned where new models are discussed. And in the pre-season skirmishing with buyers, companies will keep prize models in the closet if they're not sure of their market.

If this is a precarious existence, it also is an industry that has all kinds of interesting possibilities. For one thing, the busy season for toys corresponds with the slack time in most plants.

Presents Possibilities

If you're looking for something to do during the slow summer months, the toy industry is worth considering. Metal toys are made mostly by stamping and welding. The industry is booming—sales are up 16-20 pct this year.

And in considering the problems of toymaking, bear in mind that the American segment of the industry is relatively young. Prior to World War II, most toys were imported. The war knocked out foreign production and domestic producers moved in. Imported toys are coming back but still account for only 4 pct of American retail sales last year.

CAR WHEELS are pressed from iron powder at Lionel plant in Irvington, N. J. To make toy trains, Lionel uses 1.5 million lb of iron powder; 5 million lb of cold rolled sheet steel; 3 million lb of tin or zinc plate.

Competition is keen in the young industry and the mortality high. Last year the number of toy companies in the country decreased. But buyers recognized the importance of quality production and reliable manufacturers.

Big Market Coming

Outlook for the industry is bright. There are over 48 million children at the toy age. Births in 1955 have been at a 4 million rate. Disposable income, which is a good indicator of toy prosperity, is at record heights.

The dominant factor in the industry is still seasonal variance in sales. Toymakers are making valiant efforts to get away from this violent swing. The Toy Guidance Council in New York will spend $1.5 million this year to raise toy standards and promote the idea that toys are vital to every stage of a child's development.

You wouldn't make your boy wear December's shoes in July, say toymen. Same principle applies to toys. Kids need new ones as they develop and America's buying habits don't keep pace with normal development.

Some progress has been made in selling this message. Beach games, Easter items and the like are growing in popularity. But Christmas is still the big bonanza and no one is betting very heavily on a radical change soon.

HOW TOYS ARE BOUGHT

■ WHEN

Sixty-one percent in November and December

■ WHERE

26% in Northeast; 27 pct in department stores

■ WHO

67 pct are bought by women. One-half go to 2-6 age group

■ WHAT

By dollar volume, 18 pct of all toys are the riding type; 17 pct are dolls; 7 pct are non-riding truck, autos, etc.; 8 pct are sporting goods; 5 pct are trains.

LABOR

MERGER: How Labor Unity Affects You

United labor movement means heavy pressure on government and business . . . McDonald-Reuther feud still smoulders . . . AFL's Meany strong enough to hold control . . . What to do about it—*By Tom Campbell.*

◆ TWO YEARS ago few thought it would happen. But next week signatures go on the AF of L-CIO merger. Thus will start a chapter in the American labor movement which will frighten some industrialists and encourage others.

Behind the mass of petty questions such as "who will run the publicity?" to "who will print the new stationery?" is the cold hard fact that labor is once again united. The exception: the United Mine Workers who will stay in their isolated camp as long as John L. Lewis lives—and perhaps longer.

Editor-in-Chief Tom Campbell has been reporting labor for Iron Age for more than 19 years. His contacts include labor leaders as well as management heads. This special report is based on personal interviews with leaders from both groups.

Does this mean that the feud between David McDonald, steel union chief, and Walter Reuther, auto union head, is ended? Not by a long shot. But their competition will carry an impact upon the policies in the newly merged organization.

For the sake of harmony the official amalgamation which takes place next week has been called a merger. More than anything it is a "return to the fold" for the CIO. That outfit has served its purpose in organizing the masses of workers on an industry basis.

The Reuther Gamble

The AF of L has changed considerably since those days when Mr. Lewis started his militant Committee for Industrial Organization. Today there is no basic reason for labor to be split into two camps. And further, there was no place for CIO to go except back "home."

One of the biggest surprises was that Mr. Reuther agreed to fold up his personal tent and come back to the AF of L. But Walter Reuther hopes to make his militant and social policies part and parcel of the new organization. Will he be able to do it? That's the big gamble he is taking.

Certainly the Reuther factions will try hard to "take over" the new labor group. They may be successful in those areas where what they advocate is good for labor. Where their drive is a direct result of personal ambition it will fail.

Meany's Strength

The big question mark to many industrialists—especially those in the metalworking field—is George Meany, the head of the merged unions. Mr. Meany is a modern version of the old AF of L philosophy.

George Meany is unlike either John L. Lewis, the late Phil Murray or the late Bill Green. He is no talkathon expert. He is no user of flowery or picturesque words. He does not threaten or bluster. Nor does he give in easily. The merger is a credit to George Meany's ability as labor's first real executive.

In Mr. Meany's strength lie those factors which scare some management people and are inclined to please others. No longer can some industrialists play the AF of L against the CIO.

Business people who fear the new group do so because they feel it poses a threat in its combined strength. They also believe that labor has gone out of bounds, is too strong and should be forced to face a greater responsibility. This, some industrialists believe, could come from a stiffer spine on the part of those they feel constitute weak management. These views are not given publicly.

Labor Politics

Some of the "suspended judgment" on the new labor outfit stems from the belief that Mr. Reuther will force his demands, his outlook and his methods of "operation" on the new organization. He can't. Some time within the next two years he will find this out.

Walter Reuther is a salesman. He is a good negotiator. He is a public spellbinder. He is well liked by his own group, which is not small. Even those who don't like him feel that he can get more for them than anyone else can.

One of the biggest boosters in getting the AF of L and the CIO together has been David McDonald, president of the Steelworkers' union. Reuther and McDonald do not like each other. This lack of affection inspired Dave McDonald to devote his unflagging effort and action towards CIO's return to the fold. Mr. McDonald is also ambitious—much less than Walter Reuther and probably more than George Meany. At heart he is an AF of L type man.

He does not enjoy strife if settlements can be gotten otherwise. He is not at home—although he can perform satisfactorily—in a bar room brawl atmosphere. He believes in cooperation with management if it leads to a "reasonable" part of what he is after.

Under the new labor federation the CIO will still carry on somewhat the way it has before. But there will be a sense of restraint or more of a drive to do things for the "good of labor." That means that management does face a stronger labor front.

Strong Labor Front

Business people are probably worrying unnecessarily if they feel Mr. Reuther's methods in toto will be taken over by the new confederation of labor. But in the matter of support from AF of L and CIO unions the federation means that picket lines will take on a new meaning. From the standpoint of strength in numbers, a solid front, and added pressure upon political parties, the merged unions are a formidable factor with which to reckon.

There is a group in management which is not too worried about labor. This segment believes that basically labor and management can and should get along without periodic and costly strife. These businessmen see in the merger a return to greater responsibility by labor people. They feel that Reuther-type tactics will be restrained. They believe that a labor man who is really a leader —and they feel George Meany is such—will use some method other than strife and bombast to make gains for labor.

The Outlook

This more liberal group of industrialists wants stabilization in labor-management affairs. Costly strikes which end with management giving in after suffering untold losses are something they feel can be done without. This expanding circle of executives also feels that too much of the circus surrounds negotiations and labor demands these days.

It may take two years before either conservative or liberal management is sure of its feelings; two years for the conservative industrialists to find out that there may be a basic change in labor's methods and outlook; two years for the liberal management to find out that there is substance to their hopes.

What You Can Do About It

This looks like Labor's year:

so does next year. The merger means that pressure from labor will be heavy on you and on government. As long as business is good the screws will be turned tighter.

On Negotiations:

The AF of L and the CIO have a choice of top-notch brains for negotiations. The AF of L research people are not so well known as CIO staffs. But they are as good or better. You will need your best man across the table from now on. Maybe that man is YOU.

Unemployment Benefit Plans:

They aren't all alike. If you are asleep you may have to pay more than necessary. Study all about these plans. Figure their cost to you. Weigh their usefulness before you decide to take a strike or before you give in. Don't be wishy-washy.

Wage and Fringe Demands:

Figure out now how you will handle these demands. Make last ditch plans. Lay it on the table with your labor negotiator. Really bargain. Fight industry patterns tooth and nail. Get some concessions for yourself. Don't give up management prerogatives to the union.

Employees are Human:

Don't feel that a union contract is all that is needed. Return - if you haven't already - to a personal relationship with your people. There is no law against it. It will pay off.

Build Up Your Foremen:

They represent you to the workers. This is so despite the steward or walking delegate. Don't make the mistake of crossing up your foremen. They sell your policies.

With the aid of steelworker McDonald and electricalworker Carey plus the AF of L support, George Meany is sure to have his way.

There was no place for the CIO Autoworkers' union to go except to a merged labor movement. Feeling between Reuther and McDonald was bound to eventually lead to a schism in CIO. That would have pretty well isolated the auto union and would have furnished ammunition for Walter Reuther's enemies—of whom he has many. It also would have broken up the CIO. The steelworkers would have gone it alone or would have turned to AF of L.

Within labor's ranks there has been a cease-fire. The truce is real. The next few years will tell the real story. Until then George Meany and industry's leaders have a chance to make new labor-management history.

FINANCIAL

STEEL STOCKS: They Look Good

Wall St. takes new interest in steel stocks . . . Doubling of value in next five years possible . . . Future prices tied in with expansion . . Higher profit margins encourage investment—By *Walter Gutman.*

◆ DURING the past year, Wall Street has looked with increasing favor on the steel industry and this has been strikingly translated into stock prices.

Some holders of steel stocks have seen their investments double. Many in Wall Street think the stocks will do well in 1956. Over the next five years a doubling of steel company values is easily possible.

Basic to this new feeling of confidence is that the recession year 1954, during which industry-wide ingot operations fell as low as 61 pct, was nevertheless a good year for steel profits. It's axiomatic in any industry that if profit margins will stay up when operations go well under capacity, the future is secure. The steel industry at other times had rough going when operating rates fell to 70 pct and very rough going when they fell under.

1954 Was Turning Point

Steel prices in the past were not set or maintained high enough to keep profits up except when operations were relatively high. It looks as though 1954 was a historic year for steel, one of those rare turning points.

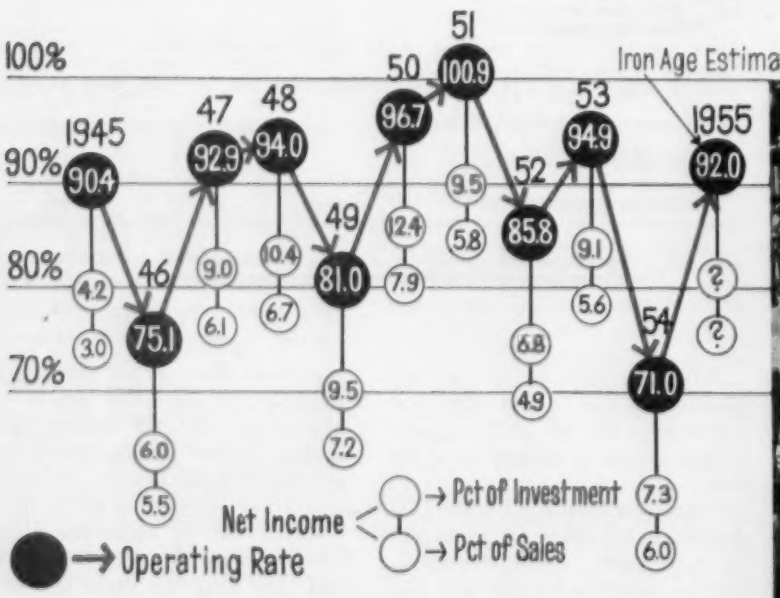
High demand for steel naturally augments investor confidence. When an investor reads that some companies have cut back production for lack of steel, he feels that the industry is not over-built. Investors like an underbuilt rather than an overbuilt situation.

Investors also like the industry's cash flow. If a company has an intelligent management, it can do things with cash, and if a company has cash, there is always a chance of getting a brighter management.

The cash flow of steel companies has become sort of fabulous. U. S. Steel Co., for instance, should have $650 million in cash flow into its treasury this year from depreciation, amortization and earnings reported after taxes. This gives it tremendous freedom to invest in new plants and pay good dividends at the same time.

Another reason investors like the industry is its improved profit margin. Profit margin is profit before depreciation, taxes, amortiza-

Steel Earnings vs. Operating Rate



TREND OF steel industry to show better profits even in poor years boosts Wall St. interest in steel stocks. Better years are ahead for steel stock market investors.

tion, interest and other charges. The improved margin is, of course, the basic reason for the huge cash flow. In 1946, U. S. Steel had a profit margin on sales of only 11.3 pct. During the first half of 1955, its margin was 25.5 pct. This change is typical. In 1946, Bethlehem Steel Co.'s margin on sales was only 8.9 pct, while thus far in 1955 it has been over 21 pct.

Steel company profit margins are not yet in the same class as those of certain companies in other industries. Du Pont's profit margin on the same accounting basis is about 40 pct. That's one reason why Du Pont sells at 225 even though it's earning only $8 a share this year, while Inland Steel, which is also earning about $8 a share, sells for 85.

Another important measure of profits is based on investment. Total cash income of the industry in 1946 was only 5.5 pct of its gross plant account plus its net working capital. In 1954, it was 9 pct and this year it probably will be about 12 pct.

Capital Needs

Because so much capital is needed to add to steel capacity, the industry's low profit margins have prevented it from having the funds it needed for adequate expansion.

The situation is better now. Cash available after all charges and common dividends this year tops $1 billion by a good margin, and the industry needs a freely available $1 billion to keep moving.

One of the best things about the industry is that in 1954, despite the recession, it generated the $1 billion it needs for expansion, after paying good dividends.

Growth Is Slow

One industry shortcoming is the lack of a strong growth trend. Assuming that the industry produces 115 million ingot tons this year, the increase in production since 1929 will be 80 pct. On an annual basis, this is only 2 pct a year. This is less than the calculated long-term growth of the economy as a whole.

Lack of growth is a serious drawback because it limits what investors can expect of the industry.

Steel management has not had to think too much about this limitation because it has been busy modernizing its plants. The industry is so huge and after the war was so far behind in its plant expenditures that management has been properly occupied in bringing its operations to a high state of efficiency.

New Expansion

Currently, the industry is in a new expansion phase which temporarily will give it the appearance of growth, but if the highest projections of future growth are taken as a guide, the investor cannot expect more than a 4 million ton addition to capacity each year from now to 1970. Over a 15-year period this is less than a 3 pct annual compound growth rate.

If the industry were advancing at the same pace as the chemicals, it would add 250 million tons to capacity by 1970; if it were equalling oil in growth rate it would add 130 million tons. But, some of the best minds in the industry think it will add only 30 million tons to current capacity by 1970.

May Diversify

Lack of growth means that at some time many companies in the steel industry will have to diversify—unless, of course, new technical developments occur which greatly increase the utility of the metal and create more growth.

This necessity is, however, one of the industry's greatest opportunities. It has huge resources in money and trained management manpower. With a proper understanding of its problems and possibilities, each company can develop in any way it wants.

Prosperity Ahead

The next few years will be very prosperous for the industry. Some of the medium sized companies will step out and become relatively much more important. By 1965, some managements will use a part of their enormous wealth to branch out into newer industries. Some have begun to do this already, and the trend will grow.

This hesitation to change with the times now appears to be over.

Walter Gutman is a well known Wall Street security analyst. He specializes in steel industry stocks.

Wall Street's Faith in STEEL'S FUTURE

- **Since 1950, steel stock holdings in 19 major investment houses multiplied six times.**
- **Steel stocks held by these companies jumped from $31 billion to $191 billion.**
- **This better than 500 pct increase compares with 221 pct boost in total holdings.**
- **Nation's investment houses hold $200,330,000 in steel securities, $174,037,000 in common stocks.**

BUSINESS

INVENTORIES: They're Way Below Sales

Stocks leveling off after slight increase in first half . . . Ratio to sales lower than a year ago . . . Book values up in third quarter but higher prices a factor . . . Situation healthy—By *N. R. Regelmbal.*

◆ INVENTORIES are remaining far below sales as bustling business pushes the economy to new heights.

Government officials say manufacturing and retailing inventories have tended to level off this summer after a slight increase in the first half of 1955.

In every major manufacturing industry sales have advanced at a faster pace than inventories, so that inventory-sales ratios in each of the last several months have been below those of the corresponding months of 1954.

The shift from inventory liquidation in the third quarter of 1954 to an attempted inventory accumulation this year has accounted for 2 percentage points of the total rise of 9 pct in gross national product this year.

An even healthier sign is that most of the advances in manufacturing inventories in the past year have occurred in working stocks rather than finished goods. Of the $1.7 billion rise in total inventory book values from September, 1954, to September, 1955, $1.5 billion came in purchased materials and in goods-in-process.

Except for automobiles, trade inventories have been generally stable over the past year, and inventory-sales ratios for almost every type of trade are lower now than they were a year ago.

Manufacturers on Sept. 30 had enough stock to last about 49 days, compared with 56 days on hand at the same time a year ago. The figures take into account higher sales this year.

By value, all inventories on Sept. 30 were worth $79.6 billion, compared with $76.9 billion at the same time last year (when sales weren't as good) and $82 billion at the end of September, 1953, when sales were about the same or a little lower.

Book Value Rises

Inventory liquidation in the third quarter of last year was at a rate of $5 billion a year. Inventory accumulation started in the fourth quarter of last year and continued into the first six months of this year, before stabilizing during the summer months.

Government statistics show a further rise in book values of inventories in the third quarter of this year, but much of it was accounted for by higher prices.

Transportation equipment manufacturers were the first industrial group to start rebuilding inventories in 1954, and accounted for half of the increase recorded by the entire durable-goods manufacturing industry over the past year. The automobile industry spurred the increase.

Inventories held by primary metal producers began to increase in October, 1954, but registered only small increases since the first quarter of this year, mainly because of booming sales.

Fabricators Lag

Machinery and fabricated metal industries started attempting to rebuild stocks later than most manufacturing groups. Inventory liquidation didn't end until last February in the fabricated metal industry, and not until April in the machinery industry. Inventory accumulation in these two industries since the turning points has been only slightly larger than the declines during the previous fall and winter.

Inventory-Sales Ratios in Manufacturing*

	1953 (Quarters)				1954 (Quarters)				1955 (Quarters)		
	I	II	III	IV	I	II	III	IV	I	II	III
All manufacturing industries	1.78	1.77	1.82	1.93	1.93	1.90	1.88	1.84	1.73	1.63	1.63
Durable goods industries	1.98	1.99	2.06	2.26	2.29	2.24	2.19	2.16	1.96	1.83	1.80
Primary metal	1.53	1.53	1.61	1.93	2.08	1.97	1.93	1.87	1.66	1.46	1.42
Fabricated metal	2.02	2.02	2.07	2.46	2.35	2.22	2.20	2.29	2.07	1.89	1.79
Machinery (Include electrical machinery)	2.50	2.47	2.58	2.77	2.72	2.68	2.65	2.60	2.46	2.32	2.32
Transportation equipment (Include motor vehicles)	1.83	1.89	1.96	2.06	2.16	2.14	2.17	2.12	1.77	1.68	1.70
Nondurable goods industries	1.57	1.55	1.57	1.61	1.60	1.59	1.59	1.55	1.51	1.44	1.45
Chemical	1.81	1.79	1.87	1.93	1.90	1.82	1.82	1.75	1.66	1.53	1.58
Petroleum and coal	1.25	1.21	1.22	1.26	1.26	1.27	1.31	1.23	1.15	1.14	1.17
Rubber	1.90	1.95	2.07	2.31	2.31	2.13	2.15	2.11	1.79	1.76	1.86

* Ratios are weighted average inventories to average monthly sales; all data seasonally adjusted.
Source: U. S. Department of Commerce, Office of Business Economics.

BUYERS: Critical Times Are Ahead

Steel buyers have already scraped the barrel . . . Cutbacks in production, turned down orders result . . . No relief ahead unless autos slow . . . Industry by industry report—By K. W. Bennett.

◆ STEEL BUYERS, surveying the bare bones of the Thanksgiving Day turkey, were graphically reminded of their own steel inventories. With the release of a fresh group of first quarter mill quotas in the past two weeks, most are asking themselves two questions: Is everybody as short of steel as I am? When will I get more?

Answer to the first question is found in a trickle of plant slowdowns involving steel users large and small; reports of at least 60,000 tons of conversion steel being sought in the Midwest; a concerted opinion among steel buyers that if they aren't slowing down now, they will in the January-February period for lack of steel; a flurry of foreign steel purchases in the past week.

Here's what buyers had to say about their steel inventories:

Large farm equipment firm: "Worst steel shortage in our buying history. We've not lost production yet, but only by making substitutions.

Producer of earthmoving equipment: "We sent men home this week for the first time. They'll be back on as soon as we get some more steel for that department.

Tank fabricator: "We've cut our work week from six to five days, for lack of steel. This week we shut down one fabricating line. We could book business for the next eight months but we've literally stopped selling.

Appliance producer: "We're living out of inventory. We're taking our total allotment and buying in production tonnages from warehouse. At that, we'll be out of steel by January, and the sales department is pushing for a higher production schedule.

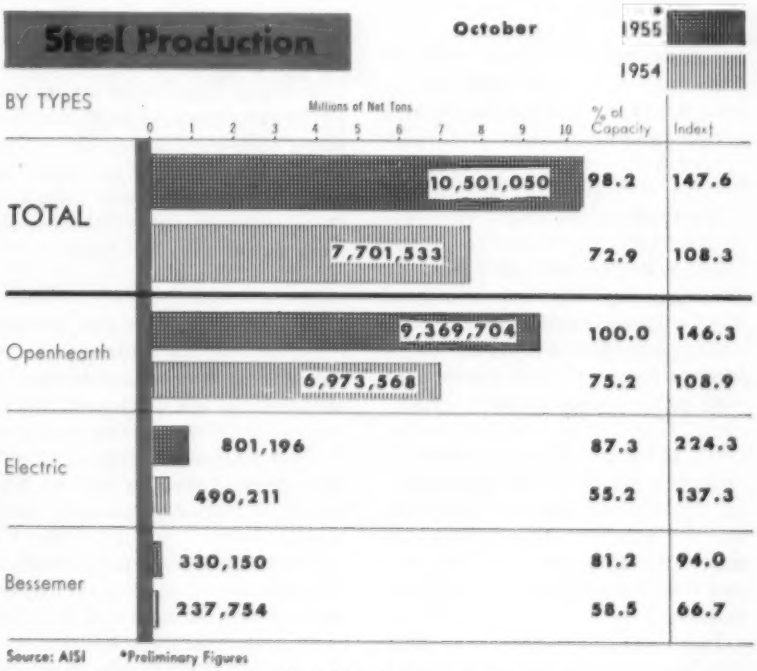
Small materials handling equipment producer: "Normally, we buy 75 pct mill, 25 pct warehouse. Currently we are buying 75 pct warehouse and 25 pct mill. We've no inventory. We have no mill quotas for first quarter.

Producer of farm equipment and heavy machinery: "We're getting about 50 pct of the steel we need for maintaining production levels. We'll be getting about 10 pct less in first quarter than we received in fourth on the basis of recently received quotas. That's incoming monthly tonnage I'm talking about, not carryover.

Small jobbing stamper: "We were dropped by two of our mill sources in fourth quarter, and the only one we have left is dropping us for first quarter. We're already buying 50 pct of our steel from warehouse, and we're delinquent beginning today on a 15 ton stampings order. We've a 40 ton a month order for first quarter that we can't cover.

Structural fabricator: "We're running 30 to 60 days behind on our own deliveries, but thus far we've done no worse than that.

Commercial fixture fabricator: "We will get hot rolled sheet in January and February. This is all carryover from November and December. We've been allotted no tonnage for March. We'll begin slowing in January."



Source: AISI *Preliminary Figures

†Index of production based on average production of the three years 1947-1948-1949.

RAW MATERIALS

IRON ORE: Just Enough to Carry Over

Stocks will be low next spring, but second best peacetime shipping year will be enough . . . Price increases in the cards for 1956 . . . Quality foreign ores bring premium . . . Demand hot—*By T. M. Rohan.*

• WITH THE second best peacetime Great Lakes ore shipping season rapidly drawing to a close this week, ore carriers are looking for an even better one next year.

And one or two hefty price increases for Lake Superior ores are already being heralded by price increases in foreign ores coming into the U. S. Demand is so hot on high quality foreign material there are rumors of gray market deals by brokers. Guesses on domestic prices next year range up to $2 per ton increase to make up ground lost in the modest increase this year and even higher wage costs next year. This could come in two shots, one at the start of the season, or sooner, the next after contract settlement.

A fast start for the shipping season is predicted for next year when no more than 18 million tons are expected to be left over at lower Lakes ports after heavy winter consumption for steelmaking. This year there were 24.5 million tons at the start of the season and a year ago 30.5 million.

WINTER closes its grip on navigation in the Great Lakes and ore carriers are now making their last trips before tieing up for the season.

Rail Shipments Drop

An increase in trans-shipments of ore during the winter to get the right grade in the right place at the right time is also probable. With a larger number of mines in production, however, steel firms have had their pick of grades this year and trans-shipment is expensive. Direct rail shipments to lower Lakes ports are dropping off from the peak of 1951 when they hit 7.9 million tons or 8.89 pct of all ore shipped. Last year they were 1.5 million tons or 2.56 pct and this year will be less than a million.

Lake shipments this year will hit about 87 million tons, far over early season forecasts of about 78 million. The largest shipper, Pittsburgh Steamship Div. of U. S. Steel Corp., has its 59 boats on their last trip south this week. Pittsburgh has racked up its biggest peacetime year of 23.6 million gross tons ore, the fourth biggest year in the history of the organization. Division president Donald C. Potts predicts 1956 will be as good as or better than this year.

Record Imports

Foreign imports of iron ore this year will hit an all-time high of about 22 million tons compared to 15.7 million last year and 11 million in 1953. Next year they will be even higher with about 12 million from Labrador alone, plus greatly increased tonnage from Venezuela.

There are even some rumors that there is a mild gray market in trading the material. Lack of published prices on foreign ores is a contributing factor. In recognition of this and the increasing importance of foreign ores, some mining firms in Cleveland are considering publishing foreign prices for the first time.

Since South American ores are not on a seasonal basis, price increases are made at any time new contracts are taken. In the last two weeks there has been a concerted upsurge on the rich, highly sought materials. Some ore from Venezuela is currently delivering in Pittsburgh for up to $24 per ton with freight bills adding to the increased price. Another factor is the high iron content. Other South American ores that have gone up in price in the last two weeks include those from Brazil at $1.35 per ton higher, Peru at $1 higher, and Chile up $1.35. Chilean ore has been rising the last several months and is now delivering in Pittsburgh at up to $24 per ton.

Liberian ore, most of it for direct openhearth charging, is selling for $1.25 per ton higher.

DEFENSE

LIFELINE: By Land or by Sea?

U. S. plans big outlays for transport of defense minerals . . . Some want shipping pushed . . . Others ask roads to Alaska, Central America and other distant points.

◆ FEDERAL government next year will be asked to cough up big chunks of cash to provide transportation facilities to bring strategic minerals to this country in an emergency.

But two divergent groups are going to kick up a real hassle to determine how the funds will be spent—if at all.

Must Have Ships

One side wants the Administration to make sure that iron, aluminum, and other strategic ores be shipped in American vessels.

They say national security—and particularly our vital steel industry—is too heavily dependent upon an uninterrupted flow of these strategic minerals to our shores to risk stoppage or lessening of imports in an emergency by depending on foreign ships for transportation.

They are asking U. S. Maritime Administration officials whether present laws will permit construction and operating subsidies to modern, specially-constructed vessels under American registry for ore carrying. They also want to know if the Administration has prepared any plans for new design ocean-going ore carriers.

Push Highway

In reply to this, the other side says that in time of war it will be at best so costly as to make it almost prohibitive in lives and vessels to ship strategic and critical materials for war across the major oceans from Europe, the Mediterranean, Africa, Far and Near East, and Australia.

They want stepped-up appropriations to complete the Inter-American highway to tap rich ore reserves in Central and South America. Overland travel removes the threat of enemy submarines, and to some extent aircraft, they argue.

Extension of the Alaskan highway, along with construction of access and connecting links in the mining and lumber areas, would mean additional resources would be easily accessible to this country by a protected overland route, they add.

Raw materials that could be made easily accessible from Central America include:

Costa Rica—Rare earths, gold, manganese.

El Salvador — Asbestos, gold, silver, lead, zinc, petroleum, mercury, sulfur.

Guatemala — Antimony, chromite, gold and silver, graphite, iron, lead, zinc, manganese, mica, molybdenum, petroleum, quartz, crystals, mercury, sulfur, titanium.

Honduras — Antimony, bauxite, gold, silver, iron, manganese, mercury, nickel, petroleum, zinc.

Mexico — Antimony, arsenium, beryllium, bismuth, cadmium, celestite, chromite, fluorspar, gold, silver, graphite, iron, lead, manganese, mica, molybdenum, nickel, cobalt, petroleum, mercury, sulfur, tin, titanium, tungsten, uranium, vanadium.

Nicaragua — Antimony, copper, emetine, gold, lead, zinc, nickel, petroleum, mercury, sulfur, tin.

Panama — Manganese, quebracho, gold.

Extension of the highway into South America would open up even richer deposits of strategic ores to protected transportation, including Venezuelian iron ore deposits, proponents claim.

Arms:

U. S. pushes development of arms inspection plan.

Air reconnaissance planes will figure prominently in government procurement plans no matter what happens on the international scene.

Here's why: The Administration is going forward with program for developing effective international inspection of arms. Eight separate groups are working on plans for ground and air inspection. A full program is supposed to be ready for presentation to the United Nations next year.

The program will include ground as well as aerial observation. The Navy and Army as well as the Air Force are setting down their thoughts. Industrial as well as military establishments will come in for scrutiny.

But a big element in any system of arms control is sure to be aerial photography. Advances in the techniques of air reconnaisance permit one plane to cover a strip of land 2000 miles long and 500 miles wide in one day.

If necessary the job could be handled by planes operating from U. S. bases. The Strategic Air Command is said to have at least eight reconnaissance wings. Tactical Air Command squadrons supplement these to put the country in a position for speedy execution of the air phase of any inspection.

Our position right along has been that disarmament would be foolish without some assurance that all parties were carrying out their promises.

EXPANSION IN INDUSTRY

Ohio Project:

Wheeling aim to make Yorkville biggest of kind

Wheeling Steel Corp. is set to spend $25 million dollars to try to make its Yorkville, O., Ductillite tin and terne plate, and light gage cold-rolled sheet mill the biggest single operation of its kind in the country.

The project includes a new 48-in., 5-stand tandem mill for cold reducing hot strip; new temper rolling mill with auxiliary equipment to process wider strip in coils; new modern box annealing capacity to replace older units; new electrolytic cleaning and scrubbing line and modernization of the existing lines.

The Yorkville expansion and improvement is part of the company's $65 million total expansion.

Additional Mechanization

Central Foundry Co., Newark, N. J., a major manufacturer of cast iron soil pipe and fittings intends to spend $2 million on a program aimed at expanding and mechanizing to a greater degree the company's operations at Holt, Ala.

Current plans call for the addition of machinery for continuous casting of two and three inch cast iron soil pipe, and modernization of other manufacturing processes and materials handling.

Company spokesman tied the expansion move to the fact that Central's sales are currently running 30 pct ahead of last year.

More for Kanigen

Victor Chemical Co. will spend $150,000 on their Nashville, Tenn., facilities in order to boost the production of sodium hypophosphite to several million lb annually.

The primary use for this chemical is the Kanigen process for nickel-plating steel.

The process is used extensively for parts in guided missiles, jet engines and rockets.

A General American Transportation Corp. development, Kanigen plating is now being done in two GATC plants as well as by two domestic licensees, Alco and Keystone Chromium, and several foreign licensees.

Titanium Jet Blades

Eaton Mfg. Co. is set to spend $8 million for capital equipment and new tools at their Battle Creek, Mich., aircraft division.

Responsible for the move is the successful completion of negotiations between Eaton, the U. S. Air Force and a major jet engine builder at which it was agreed that Eaton would supply titanium compressor blading for jet engines.

The blades wil be manufactured by Eaton's roll-forging process.

FLOOR trusses for the new Walt Whitman Bridge across the Delaware River at Philadelphia are fabricated at Bethlehem's Pottstown works and shipped suspended only six inches off the tracks between two flatcars.

Expansion Briefs

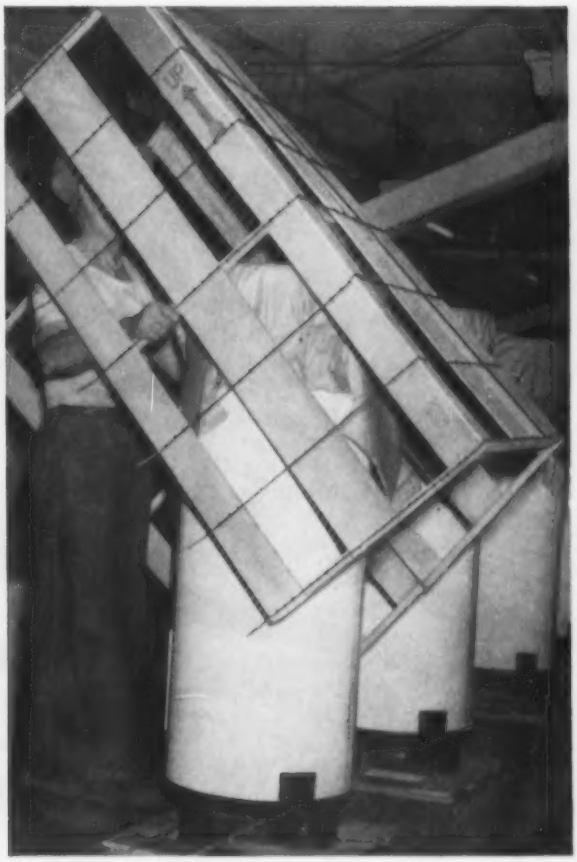
Clark Equipment Co., Benton Harbor, Mich.; expand construction machinery division by 50 pct.

Chrysler Corp.; new steel stamping plant, Twinsburg, O., will install 28 lines of stamping presses to turn out 300 different types of stampings.

Synder Tool & Engineering Co., Detroit; purchased 18,000 sq ft warehouse to replace three smaller units.

Murphy Corp., El Dorado, Ark., and **Michigan Chemical Corp.**, St. Louis, Mich.; joint venture construction of a new bromine plant; completion fall 1956.

This coal circulator weighs 539 pounds. It's assembled on base of wirebound crate. Total man-hours for packing come to just 6 minutes.



Water heater bases are bolted to wirebound crate base before assembly. At this point, only 3 minutes are needed to complete crating.

Appliance maker uses 17 General-engineered wirebounds to cut packing costs on 47 items

Gray and Dudley Co., Nashville, Tenn., obtained the figures on packing and shipping costs using wirebounds designed by General Box Company, and compared these with the costs of making their own shipping crates. The study covered 47 different designs and sizes of electric water heaters, electric and gas ranges, oil circulators, coal circulators, cast iron ranges, army ranges, and their spare parts. Wirebounds won a clean decision.

Comparison was made on the basis of man-hours for packing, shipping weights, and over-all packing costs. In the case of a 539-pound coal circulator, for example, the saving was 80% in man-hours, 10% in shipping weight, and 16% in over-all packing cost. The assembly and packing operations were integrated to save handling costs; noise and dust were eliminated, and the appearance of the products in transit was improved. The crated products have a Safe Transit O.K., too.

It's easy to find out how much General-engineered wirebounds can save you. Let us send a man. No obligation. Just write General Box.

Factories: Cincinnati; Denville, N. J.; East St. Louis; Detroit; Kansas City; Louisville; Milwaukee; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston.

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General Box

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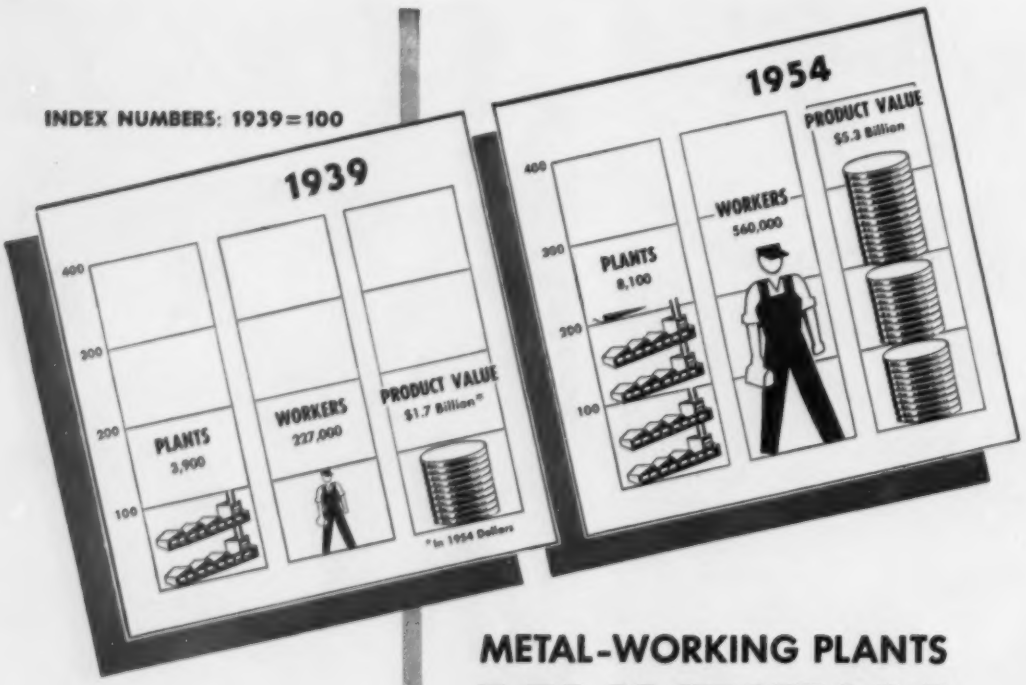

METAL-WORKING PLANTS
MULTIPLY
IN NEW YORK STATE

New York State has more metal-working plants than any other state, and over the years they keep multiplying. In the past fifteen years, the State's metal-working establishments have more than doubled in number, while the value of their products (in constant dollars) *has more than tripled!* At the same time, workers in these industries have increased 140 per cent.

More industries . . . and a greater variety of industries . . . operate at a profit in New York State than in any other. This is true of thousands of metal-working plants. It can be true of yours.

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NEW YORK STATE

Averell Harriman
Governor

Edward T. Dickinson
Commissioner of Commerce

Report to Management

What Is a Plateau?

There are some signs of a leveling off of the economic upsurge. Many production, dollar and index graphs continue to point up. Only a few show declines, but some indicate a leveling off.

These indicators used to send businessmen running for cover. It's time to retrench, is a slogan that you used to hear with every sign of a peak being surmounted or a plateau reached.

But there is a new feeling of optimism today. It is true that some segments of business will not continue to climb in the months ahead. But don't let this send you into retreat or retrenchment.

Today's plateau is yesterday's peak. The only reason some segments of business don't go higher in production is that they are operating at capacity. The same is true for some financial reports.

Many financial records of 1955 are limited by capacity. Some profit figures would be much higher if the company or business could keep up with demand. In few cases are the peaks or plateaus limited by demand.

What To Do About It

Most industry knows the answer. Some learned it earlier than others, some won't learn until it's too late. It lies in increasing capacity to keep up with increasingly strong demand for goods; first for consumers' goods, then for manufacturers' goods to make them.

You can't take the chance of being left behind. Those who don't survive will be those who didn't move ahead. Some who didn't see the signs are already finding it tough going.

Competition will be tough in spite of record demand. Your business will have to produce and deliver quantities of goods at quality and cost equal or better than your competition.

This will require better tools, better methods of manufacturing to meet the demands of competition. More efficient plants will be needed as well as the well-trained men to operate them.

Here's What Happened

You can see the evidence in the signposts of the economy. The factors required for continued good business are in evidence, will continue to gain in importance.

Confidence of consumer and producer alike is based on a mounting gross national product now at a rate better than $391 billion, up $33 billion or 9 pct from a year ago. That's when the recession period of 1954 was at an end and the recovery period that we are still in got under way.

Consumers are spending at a record rate. Third quarter expenditures advanced by $5½ billion. Retail sales show that spending rose steadily in the third quarter. And now the Christmas rush is here.

It's not all consumer spending either. Private investment continues to mount, indicating that most business realizes that more production, better methods are necessary to meet the challenge of the next few years.

Why Everybody's Happy

There's a good reason for climbing consumer demand. It's in the pay envelopes U. S. workers are taking home.

Latest Dept. of Labor figures show that the purchasing power of the average American factory worker hit a new high in October. Take-home pay rose more than 1 pct to a new record level, and prices paid by consumers were unchanged.

Since a year ago, take-home pay for factory workers has risen by more than $5 a week. A worker with three dependents takes home $72.18 a week, a single employee $64.85. This is an 8 pct increase in purchasing power.

INDUSTRIAL BRIEFS

A-Bomb Protection . . . A program aimed at protecting industrial plants in the event of war outlined at the A-Bomb and Industry Conference includes: Determination if the plant is in a target area or will itself be a target; study of plant operations, construction and facilities to determine the most vulnerable items; provision for strengthening the "weak links."

Liquid Metal . . . In the near future liquid metal as a fuel will be technically feasible and gives promise of being economically attractive, according to a report made by a group of 14 industrial organizations to the AEC's Brookhaven National Laboratory, Upton, N. Y.

Appointed . . . Industrial Lift Truck Co., Philadelphia, has been appointed to sell and service forklift trucks, powered-hand trucks, and straddle carriers manufactured by the Industrial Truck Div., Clark Equipment Co.

Technical Advisors, Inc. . . . Ann Arbor, Mich., is a newly organized group of scientists, engineers and administrators, whose aim is to assist management on technical and economic problems in the fields of product and process development, product diversification, industrial engineering, and applied research in science and engineering.

Man-made Hurricane . . . Wind tunnel constructed for Air Force testing of supersonic planes and guided missiles, at Tullahoma, Tenn., will develop wind speeds up to 3800 mph. Power is supplied by two 83,000-hp motors built by Westinghouse Electric Corp.

Ore Carriers . . . Pittsburgh Steamship's fleet of ore carriers expects 1955 to be its best peacetime year with about 23.8 million tons of ore hauled. Weather condition is the only possible stumbling block in the expected total, with the season ending about Dec. 1.

Transport Planes . . . KLM Royal Dutch Airlines has ordered eight Douglas DC-8 jet transport planes at a cost of more than $50 million. Delivery is expected in March 1960.

First in Line . . . Sherman Products, Inc., manufacturers and distributors of tractor-mounted hydraulic earth-moving and excavating equipment, claims to be the first Oakland County, Mich., corporation to be listed on the American Stock Exchange.

Atom Power Plant . . . An 11,500-kilowatt atomic power plant to provide electrical energy at the Brussels World's Fair in 1958 will be built by Westinghouse Electric International Co.

Merger . . . The Cory Corp., Chicago, manufacturers of air conditioning equipment, has purchased all capital stock of The Mitchell Mfg. Co., Chicago, also air-conditioning manufacturers.

Steel Service Plant . . . Joseph T. Ryerson & Son, Inc., steel distributor, has contracted to purchase an 11½-acre tract of land near Charlotte, N. C., for construction of a steel service plant.

Air Force Contract . . . The Air Force has signed a contract with Ryan Aeronautical Co., for continued production of Ryan Q-2A Firebee remote-controlled, pilotless jet target drone missiles.

Appointed Representatives . . . Induction Motors Corp., Westbury, L. I., appointed Wells-White Co., St. Louis, to represent them in Kansas and Missouri; Southwest Electronic Industries, Dallas, to represent them in Oklahoma, Texas and Louisiana.

Film . . . A 16-mm colored motion picture, entitled "Automation in Television," is available upon request from Admiral's Public Relation Dept., Chicago. The film shows the company's automatic machines, wire jumpers, upright condensers, tube sockets and wafer capacitors in printed circuits.

Company Acquired . . . Blaw-Knox Co., Pittsburgh, paid approximately $19.7 million for complete ownership of Continental Foundry & Machine Co.

Aircraft Production . . . Great Britain has more than doubled its aircraft production during the last five years, according to the Ministry of Supply in England.

New Divisions . . . American Radiator & Standard Sanitary Corp. has replaced its wholly-owned subsidiary, Kewanne-Ross Corp., with two new operating divisions, Kewanee Boiler Div., Kewanee, Ill., and Ross Heat Exchanger Div., Buffalo, N. Y.

New Office . . . A move to new quarters for the Milwaukee district sales office of the Babcock & Wilcox Co., Tubular Products Div., has been scheduled for Dec. 1.

New Oil . . . A new anti-rust coating oil for protection of sheet and strip steel and ferrous castings, called Sunkote A, has been announced by Sun Oil Company.

J&L cold drawn ELECTRICWELD tubing now available with a superior SPECIAL SMOOTH I.D. finish

Reduces your over-all production costs in applications like these . . .

- **cylinder tubing**
- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like inside surface finish is today busy helping manufacturers reduce or entirely eliminate costly machining on many applications and is being substituted for more costly types of steel tubing. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

J & L Cold Drawn ELECTRICWELD Tubing with a *Special Smooth* ID finish combines the physical advantages imparted by today's modern electric welding techniques with those of cold working. It withstands high internal hydrostatic pressures, carries heavy torsion loads, resists high-frequency vibration, and offers a favorable weight-to-strength ratio for applications in which loading occurs in all directions.

J & L Cold Drawn ELECTRICWELD Tubing can be furnished in its three specifications in OD sizes from ¾-inch to 2¼ inches and in wall thickness from 20 to 10 gage, 0.035 and 0.134-inch respectively.

This new booklet provides the information you need . . . specifications . . . tolerances . . . chemistry . . . mechanical properties . . . annealing . . . finishes.

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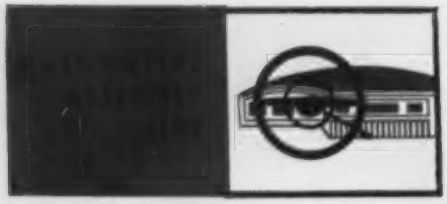


Where Detroit Gets Its Technicians

GM and Chrysler have own secondary institutes . . . Ford has classes for credit . . . Big problem is obtaining skilled mechanics for dealers . . . Ford starts more Cleveland plants—By *T. L. Carry.*

◆ ONE OF THE BIGGEST headaches facing industrialists today is the shortage of qualified, trained personnel to perform the many intricate and technical tasks which increase in number as machines advance in complexity.

This is particularly true of the automobile industry. It has reached the point where companies attempt to lure qualified engineers away from competitors with offers of more money and better working conditions.

The shortage of engineers at the manufacturing level is not the only problem facing the automakers. It has spread to just about every phase of auto production.

Here's what the auto producers are doing about the problem:

Both General Motors and Chrysler operate technical institutes for the training of young engineers. The Chrysler Institute is mostly for graduate students and is chartered by the State of Michigan to grant both masters and doctors degrees. General Motors Institute in Flint grants its students bachelor degrees.

Ford Motor Co. does not give college training as such. It does, however, have training courses on various subjects for its employees. If a person who has completed one of these courses cares to go on to college to get a degree, he usually gets some credit for the courses.

Need Mechanics . . . The shortage of trained help also extends to the dealer level and is most noticeable in the service departments.

The Automobile Manufacturers Assn. estimates that there are some 700,000 properly trained auto mechanics in the country today. This is a ratio of one mechanic for every 83 cars on the road. AMA estimates that the number of motor vehicles by 1965 will increase to the point where, to maintain the same ratio, 975,000 mechanics will be needed.

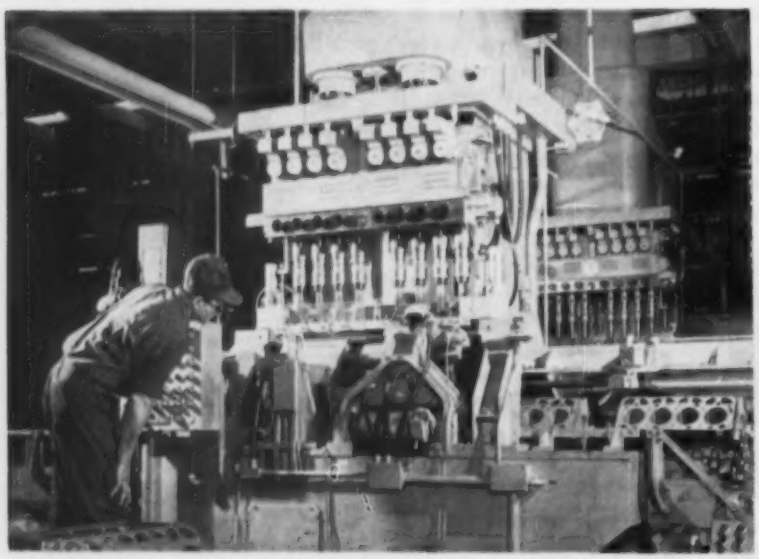
The number of auto mechanics graduating from vocational schools each year is presently about 10,000.

Vocational Training . . . In an effort to help solve the problem, AMA is cooperating with the American Vocational Assn. to increase both the number of qualified auto mechanics and the quality of training at the vocational level.

A recently published book, Standards for Automotive Service Instruction in Schools, sets up procedures for the proper selecting and counseling of students. It also suggests how to make shop layouts in schools and gives instruction for the training of vocational teachers.

In addition, dealers are being urged to cooperate in the program by donating equipment to schools and hiring teachers in the summer so that they can learn from personal experience some of the fine points of automobile maintenance.

Training of service personnel is becoming more and more important to the industry and automakers maintain elaborate training centers.



GIANT honing machines put finishing touches on cylinder bores in Ford's Cleveland Engine Plant No. 2. Latest in automation is featured in engine building. For more on Ford's Cleveland plants, see p. 79.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Nov. 26, 1955	157,641	23,703
Nov. 19, 1955	185,359	28,109
Nov. 27, 1954	120,713	19,145
Nov. 20, 1954	137,377	22,772

*Estimated Source: *Ward's Reports*

GM vs. Suppliers

Even though General Motors Corp. has always insisted that its supplier divisions be competitive with independent parts makers, it is probably the most vulnerable at this point so far as the current Senate study in Washington is concerned.

One of the biggest sources of income for a parts maker is the replacement field. Small suppliers might have a strong point in their favor when they complain that GM uses the word "genuine" on its parts.

In some cases, the only difference between GM parts and those of an independent manufacturer is the box the parts come in.

This being the case, it is questionable if GM is correct in using the word "genuine."

At the same time, it should be remembered that the practice of selling genuine parts is also carried out by manufacturers in other industries.

There is also the question if supplier parts are equal in quality to those offered by auto manufacturers. Rest assured that, given the opportunity, General Motors will point out how genuine parts sometimes protect the consumer.

New Plants:

Ford makes Cleveland second biggest operation.

Ford Motor Co., which was once centralized under the late Henry Ford's watchful eye at Dearborn, Mich., has just about made Cleveland its home away from home.

Since it started decentralization under Henry Ford II, four of the company's largest plants have been located in the Cleveland area. Most recent are a second automated engine plant and a stamping plant. Ford is now Cleveland's third largest local employer at 16,000 and the Ohio city is now its second ranking base of operations nationally.

The Latest

Latest gimmicks in the new Ford plants are:

Use of hydraulic (oil) pressure for motivating all transfer systems in the automated engine plant. Formerly air-actuated devices were used.

A Tel-Autograph communication system to coordinate delivery of proper sized piston and connecting rods to the cylinder block. This is Ford's first use of the method and eliminates stockpiling along the line and insures better-fitting pistons.

Standardization of the hydraulic actuators which transmit oil pressure to rotary motion driving shuttle carriers between machine tools and repositioning them for successive operations. Most transfer machines have 2-to-1 power drive units with short cylinder strokes and interchangeable parts. Drop cam electric controls insure split-second timing for automatic devices. All automation is wired to a press control circuit and a single downward sweep by a driver arm sends all units into action at precisely the correct moment.

How Much Will Ford Tell?

If you have been wondering just how much an auto producer makes on each car, you will get a more accurate estimate when Ford makes a financial statement prior to issuing its stock to the public.

Because other auto companies are involved in so many different enterprises, it has never been possible to judge from their earning statements just what the profit per car really is. With the exception of a tractor and farm implement business, Ford makes nothing except automobiles.

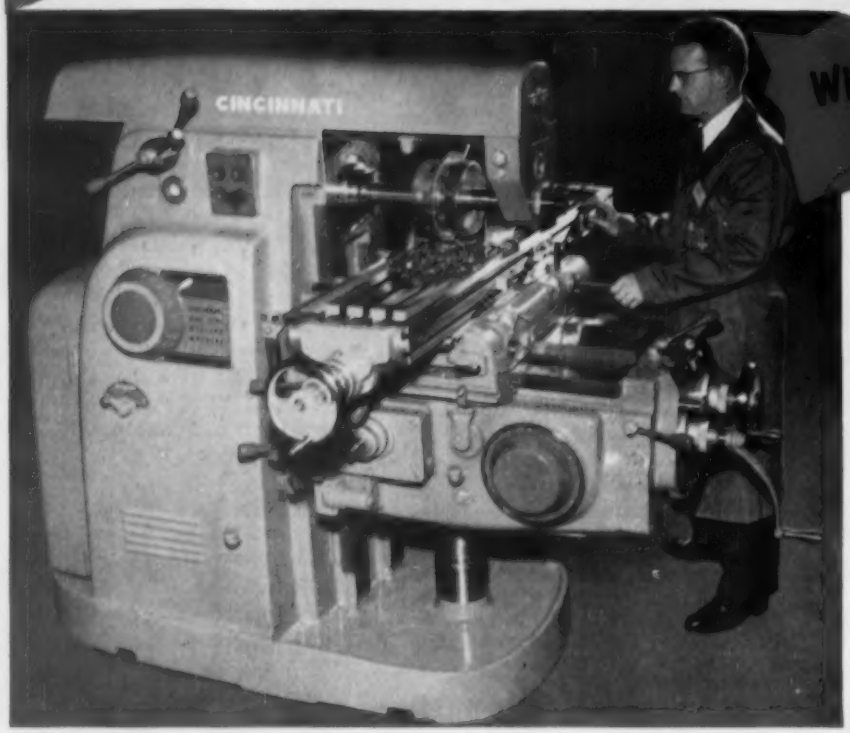
When it is revealed how much money the company has made, it will then be possible to get a more accurate picture as to just how much profit a producer realizes on each car that is built.

THE BULL OF THE WOODS — **By J. R. Williams**

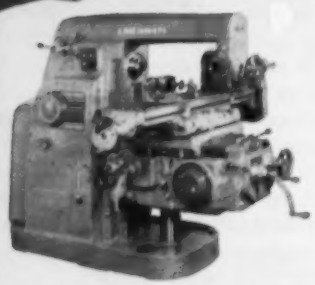
More Versatile Than Ever Before

THE NEW CINCINNATI DIAL TYPE MILLING MACHINES

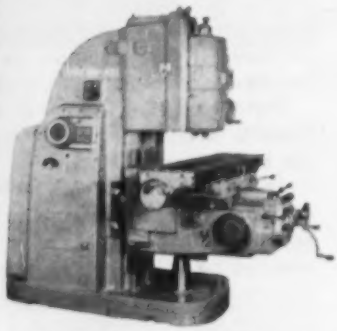
Will be a Big Hit in Your Shop



Automatic milling, using a simple one-way feed cycle on a New CINCINNATI Plain Dial Type Milling Machine with Automatic Table Cycles



The New CINCINNATI No. 2 Universal Dial Type Milling Machine



The New CINCINNATI No. 3 Vertical Dial Type Milling Machine

Ask anyone who was there. The four new CINCINNATI Dial Type Milling Machines were a big attraction at the recent Machine Tool Show. And the new Dial Types are bound to make a bigger hit in your shop . . . with the operator and foreman . . . with the methods engineer . . . with the new equipment analyst.

THE NEW DIAL TYPES are easier and safer than ever before to operate because of their dual push-button controls; complete safety from spinning hand cranks; large and conveniently located speed and feed dials.

THE NEW DIAL TYPES have the capacity to take on more work than ever before . . . higher ranges of speeds and feeds (up to 90" per minute feed rate); more than 50% increase in power; fully automatic table feed cycles if you want it; automatic backlash eliminator standard equipment.

THE NEW DIAL TYPES will satisfy the most critical equipment analyst . . . built-in, completely protected electrical controls; feed drive motor, unit construction and cradle type mounting of main drive motor reduce maintenance expense; operators can utilize their energy more productively; big variety of work, including high production jobs, can be assigned to *the New Dial Types.*

Everywhere you look you'll find new Dial Type features of value in your shop. There are many, many more than outlined here. You will get a better idea from the new catalog. Write for your copy of publication No. M-1915.

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MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

Why Canada's Boom Impresses Experts

Dominion shows rising export and domestic markets . . . Automotive leads production spurt . . . And growth comes without artificial help . . . Raw material supply backs solid prosperity—*By G. H. Baker.*

◆ CANADIAN booming economy is drawing attention of U. S. economists.

They say Canada provides a good example of how to build national prosperity for the long pull, not on short-term bubbles like quick speed-ups in defense spending or spurts in installment buying.

Long-term demand for minerals and forest products is the underpinning for her substantial and rising export trade. In addition, hefty internal demand is pushing metalworking activity to new high levels.

Many Spurt . . . Examples: Motor vehicles production is running about 21 pct ahead of 1954.

Textiles are up considerably since last year; appliances and electric equipment has received a shot in the arm as a result of the St. Lawrence contracts; railroad equipment orders are up.

Industrial machinery, facing "strong competition from foreign producers," is about holding its own.

Government officials in Ottawa say frankly they expect this year to show the sharpest annual increase in the physical volume of Canadian national output yet experienced.

Push U. S. Pay . . . The White House is trying to line up support in Congress for some "executive suite" pay increases.

Congress is being reminded that "good men" won't come to Washington because the pay is lower than in industry. The days of independent wealth are gone.

Only the higher salary brackets (waterjug executives) are being considered for increases at this time. ("Waterjug executives" are those whose civil service grade entitles them to the Washington symbols of rank: Vacuum carafe, private cubicle, carpet.)

A Mere Million . . . Estimated cost of the increases: $1.8 million annually. Among those affected: Cabinet officers, agency heads, and key administrators in the top layer of bureaucracy throughout Washington.

Drive for better pay at the top is sparked by a Hoover Commission recommendation for an "elite corps" of civil service employees.

Hoover Commission envisages a small, carefully-selected group of superior career men, paid top salaries, who would be assigned from one bureau to another as the need for their services arose. Government career employees want the extra money, but not the superhierarchy proposed by Mr. Hoover.

Too Many Quit . . . Rep. Mollohan, D., W. Va., says he's uneasy about the growing list of military men who are retiring from active duty to take jobs in industry and in government.

It looks like a "trend" to him, and he says the retired generals and admirals are "encroaching" on the traditionally civilian American way of doing business.

Mr. Mollohan has prepared a list of 33 retired Army and Navy officers whom he says are closely connected with the 100 principal firms doing business with the Department of Defense.

Calls It Strange . . . He says it's strange that none of these firms could find qualified people within their own organizations or in other companies.

Legally, there's little that Mr. Mollohan can do to stop a retired officer from taking a civilian job, but he thinks he can discourage at least a few generals and admirals by some hot talk about "deals."

[illegible]

A top-notch foreign expert in the House of Representatives warns against being misled by the current wave of Russian peace talk.

The Russians are still driving for world domination, says Chairman James P. Richards, D., S. C., of the House Foreign Affairs Committee. The "charm" policy is only one phase of the Russian's long-pull objective, which was—and still is—world conquest.

There has been no change in Russia's goals—only changes in her tactics.

The "charm" phase is calculated, according to foreign policy experts, to give them time to assimilate gains of recent years and to get their breath for the next invasion move.

SAVED $103.46 PER RING!

Switching to Flash Butt-Welding of Mill-Rolled Sections, Slashed Production Cost 76½%

NEW METHOD

Ring, rolled and welded from mill section of approximate shape of finished part.

OLD METHOD

Ring, rolled and welded from rectangular bar size to maximum overall dimensions of finished part.

Rough rings purchased by a well known manufacturer of jet aircraft engines weighed 135 pounds each. Most of this weight was excess metal which had to be machined away. American Welding's Industrial Products Division, working with this company, studied blueprints and recommended a flash butt-welded ring, formed from a special mill-rolled section. Adopting this new ring saved 88 pounds of metal and eliminated much of the machining time required. American Welding now produces thousands of these rings, in a rough-machined state, at less than one-quarter of the original cost.

Would you like to know more about American Welding and what savings it may help to effect on products which you manufacture? Write today — we will be glad to study your problem.

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Aid Prospectors

Mining prospectors are continuing to get aid from the government in their search for mineral deposits, but the number of applications for aid outpaces grants by three to one.

In October, the Defense Minerals Exploration Administration received 42 applications for financial aid. In the same month, however, only 17 contracts were signed by the agency for $307,000 worth of projects, with a maximum government participation of $200,000.

Contracts signed involve searches for copper, lead, mica, tungsten, uranium, and zinc. Largest is for a $104,700 lead-zinc project in Utah.

Since it was founded, the agency has received 2854 applications, has about 200 still pending, and has certified only 215 projects totaling $9 million with maximum government aid of $6 million. Latest batch of 42 applications would cover projects worth $2 million.

Study Noise Effects

Short-term high-intensity noise does not significantly reduce a workman's mental performance, according to tests conducted by the Pennsylvania State College for the U. S. Air Force.

Further, the College says, presence of high intensity noise does not interfere with the recall of nonsense syllables and meaningful verbal material regardless of the conditions under which the material was originally learned.

Details of the noise tests, which also cover noise and personality, and loss of hearing, are contained in a report, *"The Effects of Noise on Human Behavior"* (PB 111402), available from the U. S. Commerce Dept., Washington 25, D. C., for $2.

Supersonic Bomber

Supersonic flight is a certainty with the new Air Force F-105A fighter-bomber. In its initial test flight at Edwards Air Force Base, Calif., the plane traveled faster than sound.

Republic Aviation Corp. is the builder of the swift aircraft. It was designed for delivery of atomic weapons and non-atomic bombs and rockets at very high speeds.

The F-105A has a long, cylindrical fuselage; short, thin sweptback wings; wing root air intake ducts; and a one-piece tail section set low on the fuselage. It is powered with a Pratt & Whitney J-57 engine.

Westinghouse Engine

Navy technicians will make complete tests of a new Westinghouse turbojet plane engine at the Naval Air Turbine Test Station, Trenton, N. J.

Westinghouse built the engine, designated the J-54 by the Navy, in cooperation with Rolls Royce, Ltd., of England.

It was developed without cost to the government. Builders have provided two of the engines to the Navy for the nominal sum of $1.

Take Census Orders

The U. S. Commerce Dept. is taking orders for the various reports being published throughout the next 12 months based on the 1954 censuses of business, manufacturing and mining.

Preliminary reports being issued now cost 10¢ each or $4 for each complete series.

Order forms are available from the Department, Washington 25, D. C.; the U. S. Census Bureau, Washington 25, D. C.,

"You heard me—Stop making mountains out of molehills."

WASHINGTON NEWS

Compensation:

Proposed law may bring jump in injury claims.

Hoisted as a target for criticism and comments by workmen's compensation experts in industry and local government is the new U. S. Labor Dept. "model" employee benefits law.

In preparation for a year, the proposed rule may lead to much more severe demands on employers for funds to take care of employees injured on the job, or as a result of holding the job.

All types of physical, mental, accidental, nonaccidental ailments, including injury to an artificial limb or eye, would be covered.

Allow Late Claims

There would be no prescribed dollar limit on compensation connected with medical care, total permanent disability, or death. The recommended weekly maximum for benefits, though, is two-thirds of the average gross weekly wage of a covered worker in a given state.

Claims against the employer for occupational loss of hearing could be filed six months after the end of exposure to harmful noise. Suggested compensation is 52 weeks for total deafness in one ear and 200 weeks for complete deafness in both.

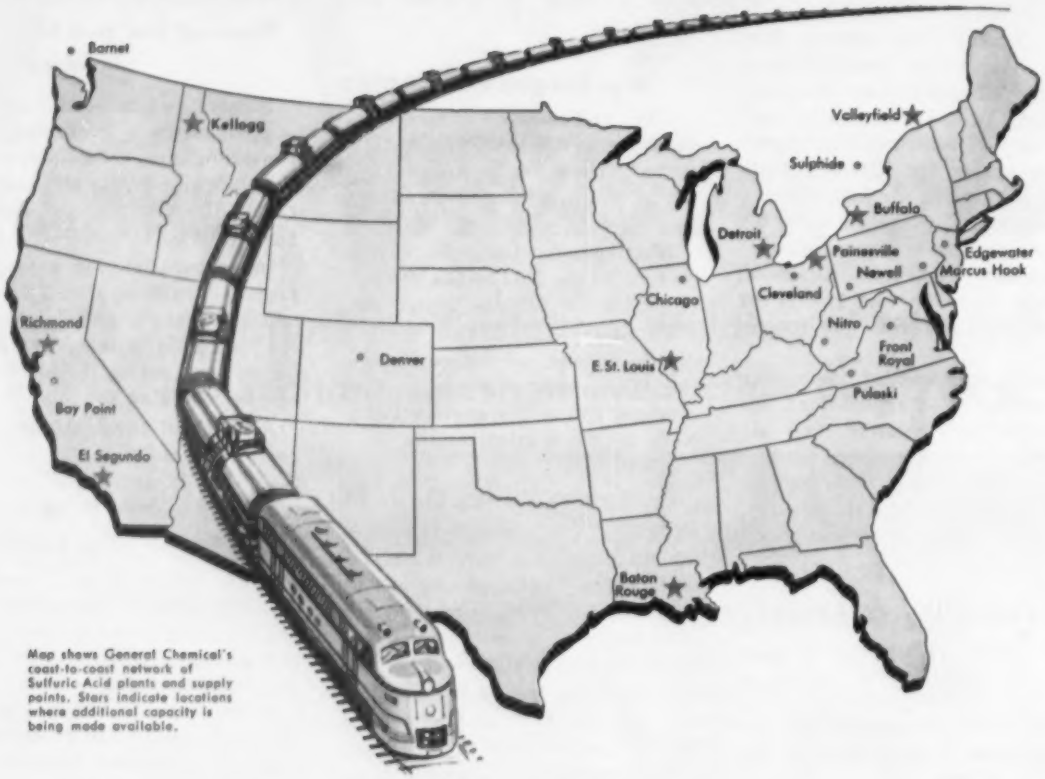
Plant Parties Count

The proposal would allow great leeway in decisions that injuries result from an employee's work, even though they may not occur on the job.

For instance, an employee who overindulges at an office or plant party and breaks a leg as he enters his yard could conceivably be eligible for compensation.

Labor Dept. officials admit the state governments may not accept their plan in detail. But they define the plan as a major step in their campaign for revisions in compensation laws.

An 80-Mile Train of New Sulfuric Acid Production!



Map shows General Chemical's coast-to-coast network of Sulfuric Acid plants and supply points. Stars indicate locations where additional capacity is being made available.

General Chemical Expands Capacity from Coast to Coast!

In an expansion that extends to all points of the compass, General Chemical is providing an additional 600,000 tons of Sulfuric Acid annually, with increased production facilities . . .

- ★ **West** at El Segundo and Richmond, Calif.
- ★ **South** at Baton Rouge, La.
- ★ **North** at Valleyfield, Que.*
- ★ **East** at Buffalo, New York
- ★ **In the Mid-west** at Detroit, Mich., Painesville, Ohio and E. St. Louis, Ill.

This means approximately 12,000 more tank cars of Sulfuric Acid available to meet growing requirements of industry . . . a train load 80 miles long! Some of these new facilities are already in production, and the others are scheduled for completion in 1956.

As America's foremost producer of Sulfuric Acid, General Chemical recognizes a responsibility to keep pace with industry's need for this vital basic chemical. No matter where you are located, you are within a short, low-cost haul of a primary producing center of General Chemical Sulfuric Acid. Remember . . . in emergencies and at all times . . . General Chemical is your dependable source of Sulfuric.

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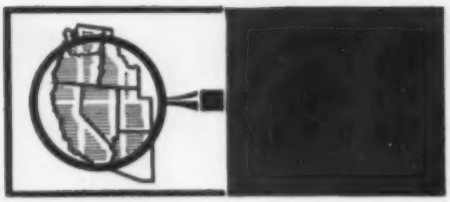
In Wisconsin: General Chemical Company, Inc., Milwaukee
*In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver



Farwest Steel Product Consumption Up

West Coast consumers are using one million more tons of steel products this year over last . . . Will eat up a record 6.2 million tons . . . New Kaiser survey highlights Coast's major markets—By *R. R. Kay.*

◆ IS THE FARWEST still an industrial bumpkin—a market "way out in the sticks?" If that's how you see it, here's news to jostle your thinking.

Steel products consumption here will jump a solid one million tons this year over last—will reach a record 6.2 million tons! And in 1956 it could well soar to another new high. Why?

For one, the area is one of the fastest-growing steel markets in the country. There's sure to be an inventory-rebuilding spree if steel shortages ease up.

Product-by-product lowdown on the seven Western states steel market is about to be made public in an authoritative survey by Kaiser Steel Corp., Oakland, Calif. Here are some highlights of western market relationship to the national market, sources of steel for the West, and where it's used.

Here's the Lineup . . . Market trend: growing demand for consumer goods and industrial equipment. Shows up in shifting emphasis on major product groups. Sheet and strip ate up 18 pct of total steel consumed last year. This compares with 15 pct in 1951.

Plates, structural shapes, and bars—a strong 45 pct in 1951—slid to 38 pct.

Oil and gas industries and residential construction still gobble up lots of standard and line pipe. This comes to about 8 pct of total consumption.

How's the Pie Cut? . . . Where does the steel go? Lion's share goes to southern California: 40 pct to 45 pct. Region takes 55 pct of all sheet and strip, 55 pct to 60 pct of standard and line pipe.

Northern California is in a firm second spot: 35 pct to 40 pct. Large canners here use some 60 pct of the tinplate.

Oregon and Washington share 15 pct of the total market, consume 25 pct of all carbon and reinforcing bars. Arizona, Utah, Nevada, and Idaho take 7 pct, with Utah the most important in the Mountain States.

Latest figures show Farwest's share of the national market is 9 pct. Tinplate gets the biggest play. Giant fruit, vegetable, and fish packing industries use 18 pct of national production. Sheet and strip users only take 4 pct. Most products average 10 pct.

The West provides half of its own steel products needs. The East supplies the other half. Local mills supply majority of: plates, standard structurals, bars, and bar size shapes. Eastern mills ship West a large part of their tubular products, wide flange beams, tinplate, light flat rolled products.

Jet Expansion . . . Ryan Aeronautical Co. has extended its expansion program to include construction of a new wing on the jet engine parts building. Previous program had enlarged the machine shop and electronics department, and established a large process tank area.

The new jet engine parts section will add 150 ft to the present 300 ft length of the building. It will add 45,000 sq ft of floor space to the company's facilities making a total of 850,000 sq ft under roof available for manufacturing and storage.

Ryan leased 4 acres of San Diego harbor land in addition to its former holdings of 40 acres in order to accommodate the expansion.

Increased activity has resulted in a jump in the payroll from 1000 to 4700 in the past year.

West's Share in Steelmaking

Product	National Shipments, Net Tons	Received by 7 Western States, Net Tons	Western % of National
Plates, Sheared & UM	5,854,000(1)	748,000	13%
Structural Shapes	4,589,000	440,000	10
H.R. Bars & Bar Size Shapes	8,004,000	797,000	10
Sheet & Strip	21,226,000	847,000	4
Standard & Line Pipe	4,013,000(2)	392,000	10
Tin Mill Products	4,961,000	894,000	18
All Other Mill Products	11,972,000	1,079,000	9
Gross Total		5,197,000	9%
Adjustment for Conversion		47,000	
Net Total	60,619,000	5,150,000	

(1) Includes an allowance for plate for pipe which has been subtracted from the (2) standard and line pipe shipments to make national figures comparable to data for western states.

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for finer finish... better edges... closer tolerances

Crucible's *complete* quality-control during production of cold rolled alloy specialty strip steels means *extra* performance in your shop. And Crucible-patented production equipment makes possible cold rolled steels with finer finish, better edges, greater physical uniformity, and closer tolerances.

At Crucible, the country's leading producer of *special purpose steels*, you'll find a group of metallurgists experienced in cold rolled steels who are ready to help you develop your specification. You'll get the steels you choose fast, too, for Crucible cold rolled stocks are large... both in coils and cut lengths.

So come to Crucible for *all* your cold rolled steel needs. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pennsylvania.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Chicago Show Begins to Pay Off

Machine tool orders take big October jump . . . Show gives bigger lift than last exhibit . . . Shipments hit year's high but backlog continues to grow . . . Doubt production push—By *E. J. Egan, Jr.*

◆ NEW ORDERS for metal cutting machine tools zoomed to an estimated total of $103.4 million in October, making it the hottest new business month the industry has had since July, 1952.

Sharp upturn in October pushed new orders $42.1 million above the level of $61.3 million attained in September, month in which the giant Machine Tool Show was held in Chicago.

Prior to October, top new order month for 1955 was June, which ended up with $77.9 million in new bookings.

Show Helped . . . Credit for the October buying wave goes primarily to the recent Machine Tool Show. It's a "natural reflection," according to Louis Polk, president of the Sheffield Corp., Dayton, and newly elected president of the National Machine Tool Builders' Assn.

Mr. Polk said: "Some companies had delayed buying until they could come to the Show and see the new models. Advances and improvements at the Show stimulated still further purchases. Thus a good deal of buying was compressed into October that otherwise might have been spread over several months."

Hope Pace Holds . . . The NMTBA president hopes that the volume of October business "indicates a new pace in modernization that will continue for months to come."

He said that many tool-replacement programs scheduled for 1956 are still in the planning stage. But, in his opinion, it is still too early to judge whether the latest new order upsurge is true evidence of a long-term trend.

Shipments Up . . . Machine tool shipments, also important statistically, eased up to a new 1955 monthly high of $60.6 million in October. This is $2.8 million above the September figure.

Commenting on past and present shipment levels, Mr. Polk pointed out that the industry has been operating substantially below capacity. For the first 10 months of this year, shipments totaled $537 million, compared to similar-period totals of $779 million in 1954.

As for the industry's backlog, latest reckoning of NMTBA's statistical department puts it at slightly over six months as of the end of October. That's about two weeks longer than it was calculated to be at the end of the previous month.

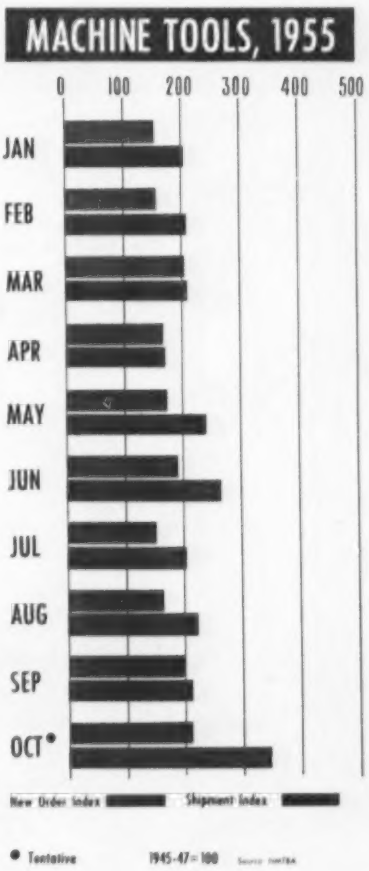
See Bigger Backlog . . . Backlogs will continue to stretch out if new orders outrun shipments as they have been doing throughout 1955. The industry has the production capacity to narrow the time lag between sale and delivery, but it would require costly overtime, perhaps even extra shift operations.

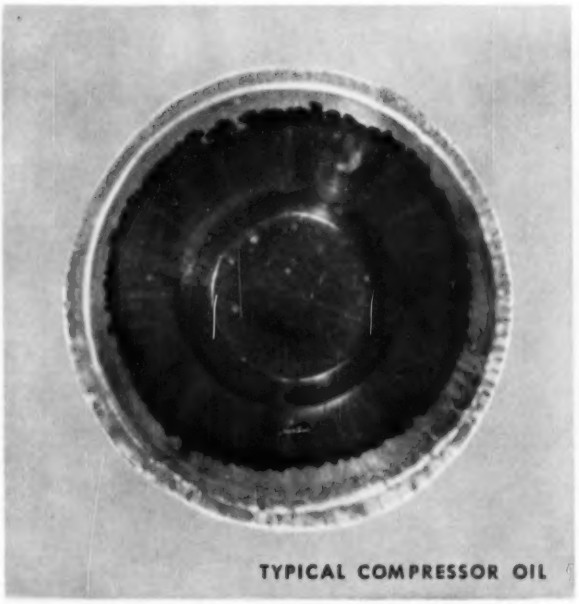
It's doubtful that there will be any wholesale stepping up of production schedules, although some builders may make some such move to gain possible competitive advantages.

There is no question that the industry picture following the recent Machine Tool Show is far brighter than it was after the last big exhibition in 1947.

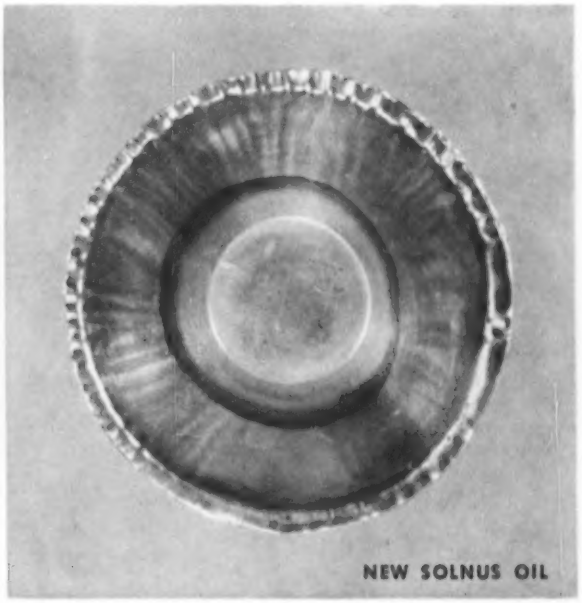
Make Better Showing . . . Effect of the September equipment display on new orders in October of that year was not as spectacular as the current gain.

From the September, 1947, level of $18.9 million, new business in the post-Show month did rise to $24 million. But that figure had already been twice-exceeded that year in previous months.





To demonstrate the comparative deposit-forming tendencies of compressor oils, two drops of a typical compressor oil were heated until evaporated. Notice the large deposit, *most of which is carbon*, left by the typical compressor oil. A new Solnus oil, after the same evaporation test, leaves a much smaller deposit.



NEW SOLNUS OILS HELP KEEP COMPRESSORS CARBON-FREE

THREE MINUTE TEST right at your desk shows why Solnus oils are the best for your compressors.

The chief enemy of air compressors is carbon build-up. The best way to avoid this hazard is to use the compressor oil that has the lowest carbon-forming tendency.

Sun's new Solnus oils have been proved to be ideal compressor lubricants. The minute amounts of carbon that form are fluffy and blow away easily . . . assurance against dangerous build-up of carbon on valves and exhaust ports. Tear-downs for cleaning are kept to a minimum.

We'd like to show you, right on your desk top, the dramatic test pictured above. Ask your Sun representative about it the next time he calls or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. SI.

Please turn to the next page

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SUN OIL COMPANY PHILADELPHIA 3, PA.

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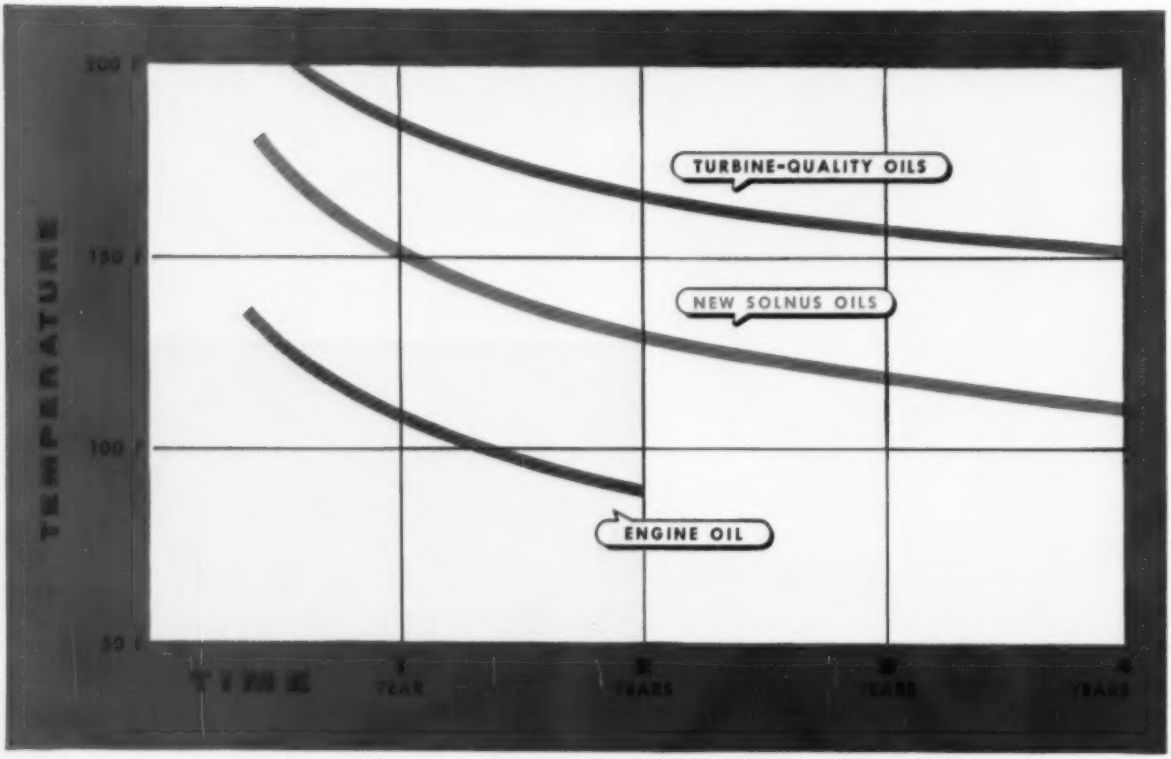

This graph is based on 10% make-up per year and a 40-hour week.
The yellow area represents approximately 80% of all applications.

NEW SOLNUS OILS IDEAL LUBRICANTS FOR 80% OF ALL APPLICATIONS

High grade lubricants for squirt-can prices . . . New Solnus oils give more lubrication per dollar

The lubricated parts of most machines—our estimate is 80%—operate at temperatures below 130 F and the time between oil changes is less than 2 years. New Solnus oils were specifically developed to meet these operating conditions at the lowest possible cost.

The above graph compares the service life of new Solnus oils with that of an expensive, turbine-quality oil, and an oil of the type old-timers call "engine oil". The service life of the turbine-quality oil is excellent and probably covers 99% of all applications . . . but for a premium price! The engine oil has a very limited life. It cannot be used safely, except for a very short time, at even moderately high operating temperatures, and it gives very little protection against rust and corrosion.

Now look at the service life of new Solnus oils. They easily meet the service requirements of at least 80% of all oil lubrication jobs and they sell for a squirt-can price! In addition, new Solnus oils are fortified to prevent both rust and oxidation . . . a feature usually found only in more expensive oils.

For the full story on new Solnus oils, see your Sun representative or write Sun Oil Company, Philadelphia 3, Pa., Dept. SI.

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INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

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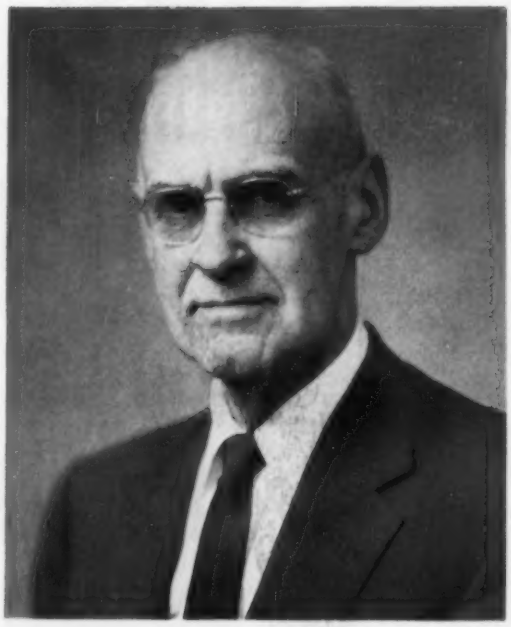

The Iron Age

SALUTES

LaMotte Grover

They come to him with the toughest welding problems. He goes over every aspect of a thing before speaking. His answers have earned him recognition at company and industry levels.

When they come up with a mean problem in structural design at Air Reduction Co., the man they turn to is LaMotte Grover. Airco's senior welding engineer and winner of this year's American Welding Society Adams Lectureship Award, Mr. Grover has a reputation for meticulous, thorough work.

"LaMotte doesn't study a problem; he dissects it," said one associate. Looking a little like an engineering professor, he works in sure, precise ways. A while back, he was involved in a contest for guessing the number of nails in a model house. Going to work with slide-rule and technical handbook, he came up with an "incontestable" answer. As it turned out, he was wrong. The prize went to his wife and Mrs. Grover insisted the answer came to her in a dream.

But if scientific inquiry doesn't pay off in give-away contests, Mr. Grover has certainly proved its worth in the welding field. He is author of the standard industry text: *Manual of Design for Arc Welded Steel Structures.* He has written numerous papers on design and construction methods for welded structures. He is chairman of various technical committees of American Welding Society and the Welding Research Council. He is a recognized authority.

In part, Mr. Grover's effectiveness stems from a broad practical and theoretical background. In his early working days, he was a highway bridge engineer, a technical specialist for the Missouri Pacific Railroad, and assistant professor of applied mathematics at Kansas State College. During World War II, he served on advisory committees for the American Bureau of Shipping and the U. S. Maritime Commission. Loaned to the government on special assignment by Airco, he gave valuable assistance to Admiral Vickery's six-man committee looking into the *Schenectady* breakup. He did a big wartime job.

During off hours, Mr. Grover's favorite hobby is making movies in his White Plains, N. Y., home. Favorite subjects are the families of his daughter, Jane, married to an Air Force officer, and son, Norman, an ordained minister now studying for his Doctor of Divinity.

Making good – fast!

NEW the Norton R51 Centerless Feed Wheel

Not just the "other" wheel on your centerless grinding setup — not just another feed wheel! But a Norton "Touch of Gold" development that proves the importance of the feed wheel to economical centerless grinding.

Users report latest Norton development a top-performing aid to better, lower cost centerless grinding

Shopmen who have tried the new Norton R51 centerless feed wheel have come out strong for this latest Norton aid to more efficient centerless grinding. Here are some typical R51 performance reports:

"They hold form twice as long as previous wheels."

"No slipping, lighter cut with diamond required when truing."

"An excellent wheel; no chipping, holds a much better corner and dresses easier."

"Eliminates chatter and gives us better all around grinding results."

The secret of this greatly improved performance is in the exclusive Norton manufacturing methods. The unique abrasive-and-bond combination lengthens wheel life, increases form-holding ability, reduces the need for dressing and eliminates slippage. And as a result of close control during manufacture, R51 wheels are consistent throughout — from wheel to wheel and lot to lot.

Finally, you get time-and-money-saving simplification with R51's. Just one grain and grade will handle the widest range of jobs.

Heighten the "Touch of Gold" in your centerless operations by teaming up the new R51 feed wheel with the right Norton grinding wheel. And remember: only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost.

R51 wheels are available in all common feed wheel sizes. For complete facts write to NORTON COMPANY, 93 New Bond Street, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

W-1481

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BEHR-MANNING DIVISION: Coated Abrasives
Sharpening Stones • Pressure-Sensitive Tapes

PERSONNEL

EUGENE P. HAWKINS, appointed vice president, Michigan div., Revere Copper & Brass, Inc., Detroit.

The Iron Age INTRODUCES

Walter J. Korash, appointed vice president, engineering, **Duro-Test Corp.,** N. Bergen, N. J.

M. R. McLary, appointed vice president, Ingersoll Products Div., **Borg-Warner Corp.,** Chicago; **W. O. W. Smith, Jr.,** named sales engineer, and direct factory representative, Rockford Clutch Div., Houston.

Carl C. Kamphausen, appointed executive vice president, **Allied Products Corp., Paul H. Herbst,** appointed acting manager, Victor-Peninsular Div., Detroit; **Edmund Patera,** appointed plant superintendent, Detroit; **Edward F. O'Shea,** appointed acting manager, Precision Ground Parts Div., Hillsdale; **Jack Roberts,** manager, Powdered Metal Parts Div., Northville; **W. Curtis Miller,** appointed president's staff, Hillsdale.

D. Frank Mederos, appointed vice president and assistant to the president, **Walworth Co.,** Boston.

Conrad Bergmann, appointed vice president, **Peerless Steel Equipment Co.,** Phila.; **Francis E. Timlin,** appointed secretary and treasurer; **A. H. Kappenberger,** appointed assistant secretary; **A. F. Rosenberger,** appointed vice president, production; **H. W. Crane,** appointed vice president, sales.

Robert McC. Maxwell, appointed executive vice president, **Chandler Boyd Co.,** Pittsburgh; **James L. Perrott,** appointed sales manager.

Victor H. Sutherlen, appointed assistant sales manager, Oldsmobile Div., **GMC Corp.,** Western U. S.; **George G. Clemeson,** appointed Southwest regional manager, Dallas; **H. J. O'Connell,** appointed zone manager, Chicago.

Gordon B. MacKenzie, appointed manager, dealer planning and placement dept., Lincoln Div., **Ford Motor Co.,** Dearborn, Michigan.

Donald C. Altman, appointed manager, industries group, **Allis-Chalmers Great Britain Ltd.,** London.

Howard C. Jones, appointed director, manufacturing, Consolidated Vacuum Div., **Consolidated Electrodynamics Corp.,** Pasadena, Calif.

Richard G. Carney, appointed district sales manager, St. Louis, **Jones & Laughlin Steel Corp.; Chester M. Kuhns,** appointed district sales manager, Cleveland; **Alfred C. Pollock,** named district sales manager, Columbus; **Robert B. Clark,** appointed assistant district sales manager, Chicago.

WALTER E. FROEHLICH, elected vice president, sales, research & development, Associated Spring Corp., Bristol, Conn.

G. THEODORE ZAHNKE, appointed general manager, three Bristol divisions, Associated Spring Corp., Bristol, Conn.

C. H. WILLS, appointed vice president, Michigan Abrasive Co., Detroit.

Edward G. Merk, elected vice president, sales, **Benchmaster Mfg. Co.**, Gardena, Calif.

John F. Karr, appointed manager, market research, **The Trane Co.**, La Crosse, Wis.

M. H. Smith, appointed assistant manager, **Hyster Co. factory**, Nijmegen, Netherlands.

H. J. Marty, named district manager, New York office, **The Ohio Knife Co.**, Cincinnati.

James J. Finley, Howard F. Gemperline, and **Dr. Helmuth W. Schultze**, appointed to staff, Metals Research Lab., **Electro Metallurgical Co.**, Niagara Falls, New York.

Ralph L. Mudge, Jr., appointed production manager, **Burroughs Corp.**, Detroit.

Harold J. Coleman, appointed sales manager, **Chandeysson Electric Co.**

Fred I. Courtney, elected comptroller, **Virginia Metal Products, Inc.**, Orange, Va.

Anthony A. Toggweiler, appointed assistant district sales manager, Chicago, **Republic Steel Corp.**, Cleveland.

Fred S. Haas, named director, product engineering, **National Automatic Tool Co.**, Richmond, Ind.

C. Edward Ball, named marketing manager, **The Hill-Chase Steel Co.**, Maryland.

A. L. Caney, appointed general sales manager, **Tuthill Pump Co.**, Chicago.

W. S. HOSKIN, appointed general sales manager, Michigan Abrasive Co., Detroit.

G. O. BRITTON, appointed manager distributor sales, American Hoist & Derrick Co., St. Paul, Minn.

ROBERT G. McCOY, named plant industrial engineer, Ferndale plant, Steel & Tubes Div., Republic Steel Corp., Detroit.

WILLIAM J. NELSON, appointed methods engineer, Republic Steel Corp., Cleveland.

ALLMETAL'S AWARD COMMITTEE huddle includes (l. to r.) Stanley R. Marsh, Marvin Tabak, Jack Epstein, and Nat Epstein. Stainless steel plaque will be awarded to the editor of the magazine carrying the winning article.

$1,000 ALLMETAL AWARD ANNOUNCED

Allmetal Screw Products initiates award for top article about stainless steel

Attempting to bring more information about stainless steel to industry, Allmetal Screw Products announced its sponsorship of an annual award. First prize: $1,000 to the author of the industrial magazine article of most value and interest to those who specify or buy stainless steel parts or components. Need for the award was realized when Allmetal (leading manufacturer of stainless fasteners) found U. S. annual stainless steel volume to have doubled since 1945—but communication about its applications at pre-war level. Hoped-for results: articles about stainless that are clearer, documented, and more informative. Winner will be announced in February at the Garden City, New York, plant.

PANEL FROM STEEL INDUSTRY TO PICK WINNING ARTICLE

ALLEGHENY LUDLUM'S F. Price Norris, Jr., Director of Stainless Steel Sales.

ARMCO'S R. G. Sloan, Manager, Development Engineering Department.

AISI'S Richard E. Paret, Secretary, Committee of Stainless Steel Producers.

CRUCIBLE'S James D. Glenn, General Manager of Sales.

Edward J. Lunney, named chief engineer, research and analysis dept., **Barry Controls, Inc.,** Watertown, Mass.

Grant McDonald, appointed manufacturing manager, distribution equipment div., **Square D. Co.,** Detroit; **Anthony Kasper,** named controller.

Donnell W. Newman, appointed manager, sales, supply div., **U. S. Steel Corp.,** Chicago.

Charles H. Luikart, appointed assistant district sales manager, **Kaiser Aluminum & Chemical Sales, Inc.,** Cleveland.

Elizabeth M. Wilkie, appointed assistant sales manager, **The Kensico Tube Co., Inc.,** Mt. Kisco, New York.

Howard M. Perry, appointed manager, product services, **General Electric Co.,** Fitchburg, Mass.; **F. C. Miller,** appointed manager, marine sales, small turbine and supercharger dept., **Richard C. Schey,** named manager, Northwest district, **General Electric's construction materials,** Bridgeport, Conn.

Charles T. Schwartz, appointed Chicago branch sales manager, **The Yale & Towne Mfg. Co.,** Philadelphia.

Arthur J. LeVasseur, named purchasing agent, Three Bristol Divisions, **Associated Spring Corp.,** Bristol, Conn.

Douglas McIlvaine, appointed director, research and development, **Acro Manufacturing Co.,** Columbus, Ohio.

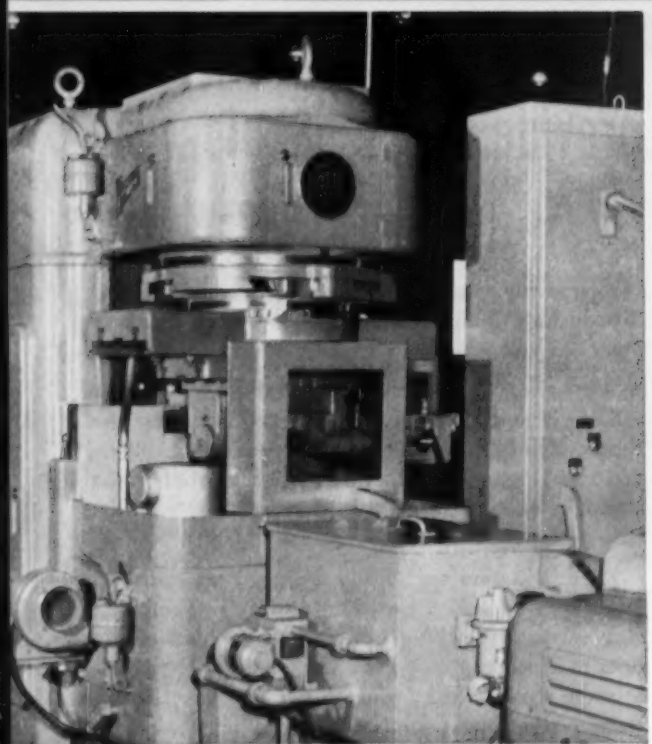
David C. Ekey, appointed director, research, **Lebanon Steel Foundry,** Lebanon, Pa.

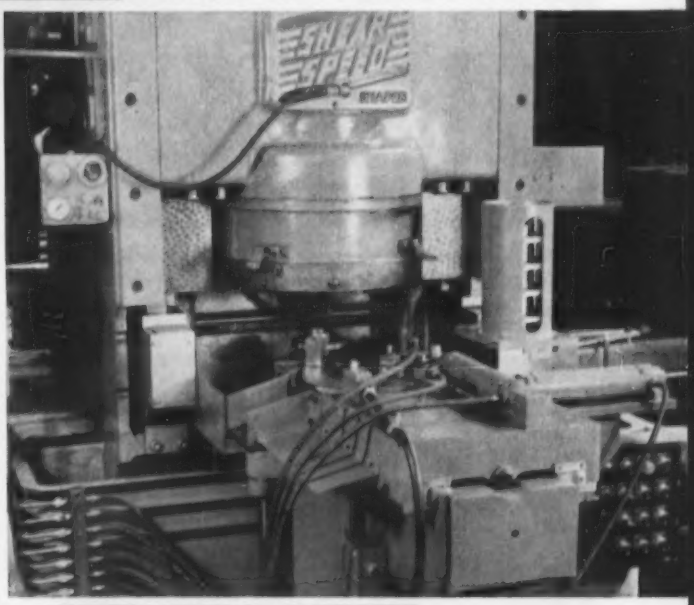
Carl A. Read, Jr., appointed sales engineer, New England, Taylor-Wharton Div., **Harrisburg Steel Corp.,** Harrisburg, Pa.

This Month's

GEAR PIX

NEW LARGER ROTO-FLO spline roller, Model 1551, is capable of cold rolling toothed parts with diameters up to 2 inches. Complete information on this fastest method of forming splines and similar toothed parts is given in Bulletin RF-55.





NEW AUTOMATIC LOADING for Shear-Speed gear shapers, plus automatic size control, offers completely automatic operation on all 1800 series models. Can be specified on new machines or added to Shear-Speeds now in the field.

CONTINUOUS, AUTOMATIC, FAST gear shaving on this Michigan 870-A gear finisher includes automatic size control, hopper feed, washing, and checking for correct size and helix angle. These Michigan gear shavers are used in continuous gear production lines—or in unitized groupings.

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO., LTD.

REPUBLIC BOXES and simplify parts handling

Republic Boxes and Skids are used on the production line at Toledo Scale. Parts are moved from one machining operation to another quickly and easily by lift truck or hand-operated units.

Finished parts are stored in neat areas like this. Boxes are labeled with part numbers. Box and skid design permits easy visual inspection for inventory checks. Fits in nicely with other-type units.

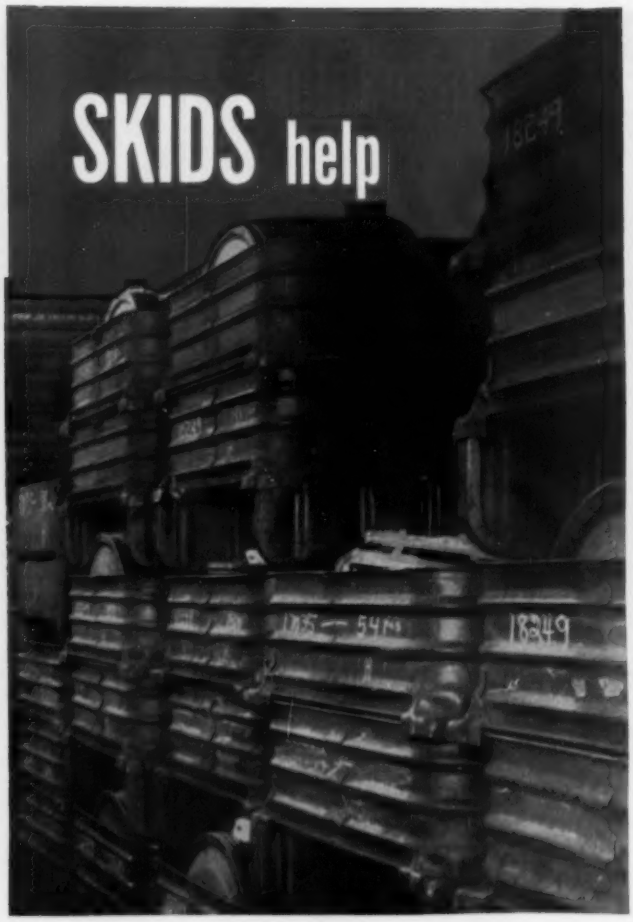
...provide Toledo Scale with keep everything

Neat, wide, uncluttered aisles are typical of the Toledo Scale Company plant at Toledo, Ohio. Republic Steel Box and Skid Units are used at practically every stage of production, from receiving to shipping.

For example, keeping track of and handling the thousands of parts needed for the products manufactured by Toledo Scale could be a difficult job. But, the company does it efficiently and at low cost with the help of Republic PB-130 Box and Skid Units.

These units are specifically designed for stacking. Box capacity can be varied by adding or removing ring sections. Stacking brackets are welded to the bottom corners of each box. Tiering lugs are welded to some boxes so that, when they are used as the top section, additional complete units can be tiered.

The skids are equipped with bumper-type channel runners. These are arc welded to the skid legs adding



a place for everything— in its place

strength to the sides and protecting skid ends and floor surfaces.

The PB-130 is only one of many types of box and skid units manufactured by Republic's Pressed Steel Division. There is a wide range of sizes from which to choose. Or if you have a special handling problem, Republic engineers are available to help you design a unit to meet your individual requirements. The coupon will bring you more facts by return mail.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

SIMPLIFY WEIGHT PROBLEMS WITHOUT LOSS OF VITAL STRENGTH. The high strength-to-weight ratio of Republic Alloy Steels permits smaller sections to carry heavier loads safely, like the gears and shafts of this huge power shovel. Vital parts are tough—resist shock, impact, vibration. Republic metallurgists will help you select the proper analysis for your product.

SIMPLIFY YOUR FLAT ROLLED STEEL PROBLEMS. Republic produces a wide line of flat rolled products including hot and cold rolled sheets and strip, galvanized, galvannealed, electro-zinc-plated, silicon steels and many others. The world's widest strip mill—98 inches—operated by Republic, produces steel wide enough for one-piece auto tops.

SIMPLIFY YOUR FASTENER BUYING. Republic's Bolt and Nut Division makes more than 20,000 regular types and sizes of headed and threaded products—over 8,000 specials. Everything from machine bolts to "Nylok" Nuts and high-strength bolts. You can depend on Republic Fasteners for quality, ease of application, uniformity, long service life. Quick delivery, too.

REPUBLIC STEEL CORPORATION
3104 East 45th Street
Cleveland 27, Ohio

☐ Please have a Materials Handling Engineer call.

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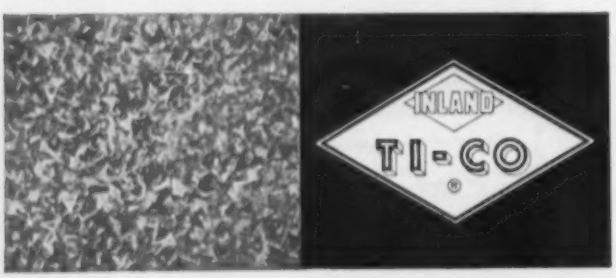
X-3052A

35,000-lb. drop-hammer fails to flake Inland TI-CO!

The ability of Inland's TI-CO galvanized steel to take punishment without flaking of the zinc coating was recently put to the supreme test. A sample sheet of TI-CO was slugged with a lethal blow from a 35,000 pound drop-hammer, one of the largest in the world. When the dust settled, the piece of TI-CO was carefully examined for any evidence of flaking. None was found! TI-CO took the blow in stride and the zinc coating stayed put!

Unlike ordinary galvanized sheets, the protective zinc coating on Inland TI-CO, produced by the patented Sendzimir process, will not crack, flake or peel when stamped, crimped, double-seamed, brake formed or even when formed by spinning. This flexible, uniform coating means that products made with TI-CO are easier and cheaper to produce because re-dipping after forming is eliminated. And they stay serviceable and good-looking longer, too!



It will pay you to specify Inland TI-CO for all your galvanized steel requirements. INLAND TI-CO . . . with the zinc coating that rolls with the punch.

INLAND STEEL COMPANY

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The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Smoothes production flow—

Mechanized Heat Treating—The Growing Trend

◆ Completely mechanized heat treating departments are no longer a novelty . . . They are the logical addition to complete shop automation for maximum efficiency.

◆ Planning the mechanized heat treat layout calls for ingenuity . . . No one system is 'fool-proof," universal . . . But most floor arrangements can be adapted to either the integrated or dispersed "pattern."

By O. E. CULLEN, Chief Metallurgist, Surface Combustion Corp., Toledo, O.

◆ MECHANIZED heat treating equipment is effectively pointing the way to automation in the heat treat shop. Already in operation are many completely mechanized heat treating departments. Individual heat treating processes are also being systematically integrated into the automatic production line.

The trend is unmistakable. As a result, current planning calls for mechanized heat treating equipment for those processes where size of product, speed of operation, or need for skilled operators previously discouraged a completely automatic setup.

Processes now being groomed for the "automated look" include just about all types of heat treating and heating for hot forming. They include hardening, tempering, normalizing, annealing, carburizing, carbonitriding, and carbon restoring.

Justification for the trend to a more complete mechanization of all production facilities is simple logic. Obviously the continuity of plant operations can not be accomplished if heat treating facilities are dropped from the overall plan and shunted to an isolated portion of the plant.

It is equally clear that not all heat treating facilities can be conveniently transferred directly to the production line. But amazing compromises are being worked out every day.

Certain phases of heat treating may never be fair game for total automation. For example, metal parts of such size or condition that their heat treatment must be carried on in specialized areas might not be handled economically in any other way. This does not imply that automation must be confined to a single machine, department, or even one building in a production plant. Tying together all phases of heat treating in perfect sequence is complicated, but not necessarily insurmountable.

The advantages of automation in heat treating have been mutually recognized by both users and manufacturers of equipment. Both are cooperating in the development of furnaces, atmosphere generators, and accessory handling equipment to meet immediate needs.

The forging industry presents a typical ex-

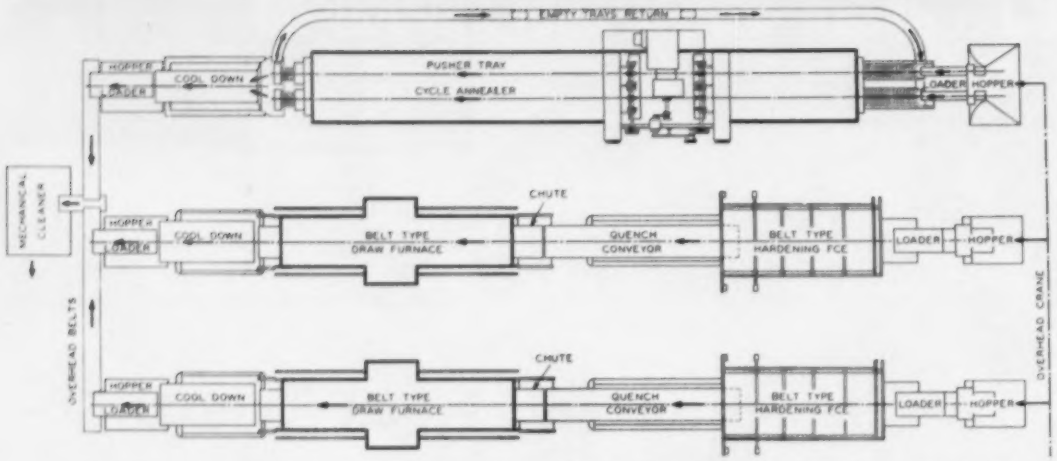


FIG. 2—Schematic view of fully mechanized forging and heat treat area designed to process forgings through variety of heat treatments.

ample of this cooperative spirit. In recent years, forging machines have taken over a large number of operations in the forging industry. Production limits for such equipment as vertical presses and horizontal upsetters are set primarily by ability to supply hot billets, transfer from one die station to another, and remove forgings to auxiliary equipment.

With high speed press equipment available, it was up to the heating equipment manufacturer to make possible full utilization of press capacity. Unfortunately, the press does not provide means for removing scale from the billet. This scale is often imbedded in the surface of the finished forging. When it accumulates in the die cavities, it causes excessive wear and requires frequent shutdowns for die maintenance.

This problem was solved by the development and application of high speed heating equipment capable of delivering uniformly heated billets to the forging stations on a fixed cycle. Equally important, scale formation is minimized. A typical installation is shown in Fig. 1.

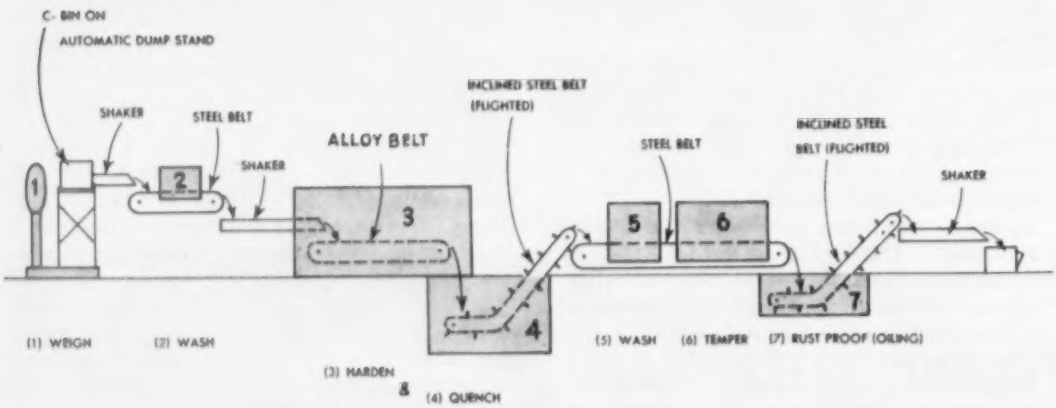


FIG. 3—Layout for belt-type furnace line intended for small parts. Carburizing, carbonitriding, bright hardening are handled.

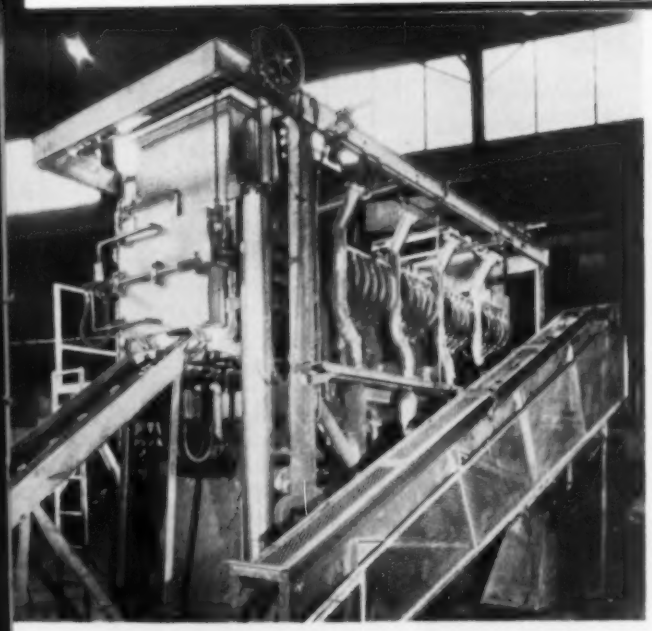


FIG. 1—High speed furnace heats billets for forging automotive gears, discharges heated billets automatically on special chute.

Production rates attainable with this type of equipment have surpassed the ability of crew members to handle billets. The equipment has upped the production of ring gears by nearly 100 pct at a leading automotive forge shop. An unskilled worker loads billets on a conveyor and also delivers heated billets to the first die position in the forging press. A continuous supply of heated steel is maintained, and hand labor is held to a minimum.

This type of application makes use of the principle of high thermal head operation. A conventional fuel-fired furnace requires 20 to 30 minutes per inch of billet thickness to raise the temperature to forging level. The same job is done in the new high speed, fuel-fired furnace in 2½ to 3 minutes.

The extremely short heating scale drastically reduces oxide scale. But it also contributes another outstanding advantage. Quick heating avoids excessive grain growth in the steel and appears to improve forgeability. Billets up to 10 in. thick and weighing over 1000 lb have been successfully heated by this method.

Most forgings are heat treated before machining or other finishing operations. Fig. 2 shows a forging and heat treat area that is fully mechanized to handle forgings to and from diversified heat treating equipment by means of overhead handling systems. Heat treat cycles include hardening, tempering, and cycle annealing.

A combination of recessed floor level hopper and vertical hinged flight conveyor is provided for automatic loading at the charge end of each furnace line. This arrangement permits direct charging of the hoppers from overhead.

Parts are lifted from the hopper by the conveyor-loader. They are subsequently dropped at specified intervals onto the belts of the harden and draw furnace lines and into trays provided for cycle annealing.

The automatic arrangement at the discharge end of each furnace combines inclined and vertical slot type hinge conveyors that automatically remove the parts from the water quench. Parts are then deposited on a system of overhead interchange belt conveyors feeding the mechanical blast cleaner.

All furnace lines are arranged to feed the cleaner interchangeably or at the same time.

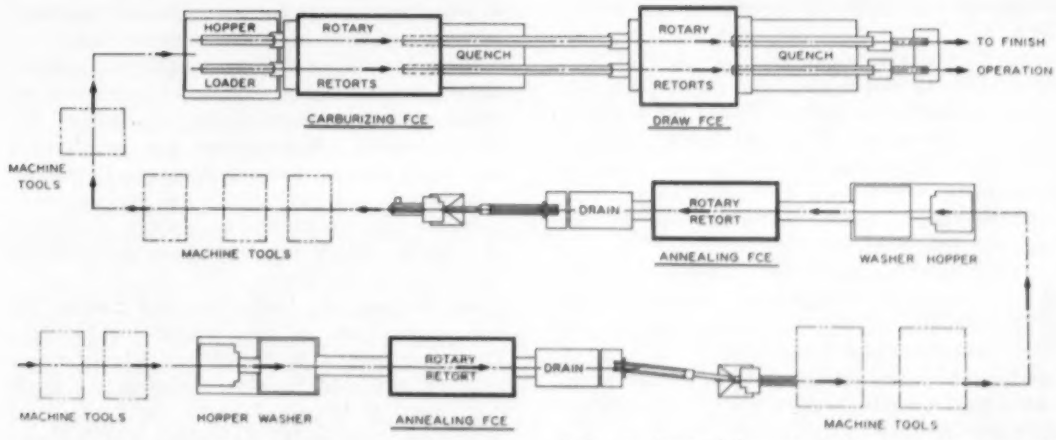


FIG. 4—Typical layout showing rotating retorts capable of tumbling work during heat treatment and conveying parts between furnaces.

Cleaner capacity is about 700 lb per hour. After the parts are cleaned, they are sorted into tote boxes according to type. Further improvements will eliminate the tote boxes entirely. Conveyors will then be used to move the various heat treated forgings to their respective machine lines.

Annealing is done in a direct gas-fired cycle annealer of the two row pusher-tray type. It isothermally anneals forgings of 8617, 1117, and 1137 at a rate of about 2000 lb per hour.

A typical 10-hour cycle involves heating to 1630 to 1680°F, fast cooling to 1200°F and holding at this temperature, and finally discharging into water which is maintained at about 200°F. The cool-down operation prior to water quenching minimizes shock and helps remove loose scale. Hardness is held at an optimum machining level.

The direct-fired harden and draw lines are of the continuous conveyor-belt type. Both 1140 and 1137 forgings are hardened on these lines. Quenching temperature is about 1600°F, followed by a draw at 900-1300°F, depending upon hardness desired. Capacities of these hardening furnaces run as high as 3000 lb per hour.

Two common types of furnace lines used for carburizing, bright hardening, carbonitriding, and carbon restoration of small parts are shown in Fig. 3. Such belt-type furnaces provide for both conveyance through the furnaces and drop quenching. Bolts, nuts, small forgings, ball and roller bearing parts, and small stampings are among the parts handled.

Handles parts automatically

Handling is completely automatic from the time the work is placed in a feeder hopper until it is discharged from the tempering furnace. In some instances, the supply of parts is brought directly from machines to the hopper and removed from the heat treat line on conveyors for direct delivery to the next operation.

Revolving retorts can also be used for both heat treating parts and conveying them between furnaces. A typical layout is shown in Fig. 4. Uniformity of processing is assured, since the work is tumbled during its movement through the line. Such equipment lends itself to carburizing, carbon restoring, dry cyaniding, and bright hardening.

This type of equipment works most efficiently in the completely integrated, fully automatic production line shown. It is being used to produce universal joint bearing races on a mass production basis. Press forming, machining, annealing, washing, carburizing, hardening, drawing cooling and finish grinding are wholly integrated.

The rotating retorts are equipped with controlled atmosphere for both carburizing and annealing. Advanced methods for sealing and heating permit controlled carbon potential as well as quenching under atmosphere.

A similar type of integrated line is used in the same plant to produce the journal crosses used with the bearing races. A combination of machining, hopper loading, metered furnace charging, carburizing, quenching, washing, reheating, quenching for final hardening, washing and drawing all fit into an integrated line prior to final grinding.

To complete the automation feature of this plant required the further integration of the torque tube production line. Steel strip is automatically uncoiled, roll formed, welded, cut to size, trimmed, stress relieved at 700°F, water cooled, and conveyed to a final cutoff table.

This high production plant uses dispersed integration of a number of different furnaces. Each furnace handles a separate heat treating operation. The furnaces are so arranged among machine tools and other processing equipment as to allow for the complete automation of the entire installation.

Controls centralized

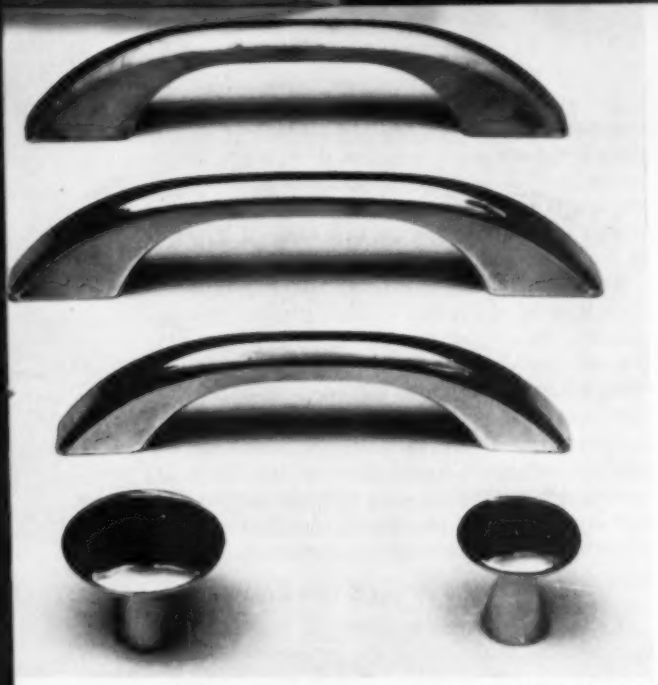
An interesting feature is the method for centralizing control of all furnaces scattered throughout the plant. Overall quality control is maintained by the metallurgical laboratory. The same group supervises furnace operations very much as a set-up man follows a machine line. To facilitate control of the widely scattered equipment, a central "trouble" panel is used.

This L-shaped, control-indicating panel ties in with all of the individual drive mechanisms for pumps, fans, conveyors, and ignition systems for each furnace and prepared atmosphere generator. A green light signals satisfactory operation. A red light followed by an audible signal pinpoints trouble.

This one control panel hooks up with 13 continuous furnace lines, two special furnaces, and six prepared atmosphere generators.

Both endothermic and exothermic atmospheres are available. The generators are located at a central point directly behind the control panel. Atmospheres are manifolded and piped directly to each furnace. Enriching additions for gas carburizing are made prior to entrance into the particular furnace. A variety of mixers and valves have been installed to handle this operation.

All temperature indicating and controlling instruments are of the potentiometer type. They are located in an air-conditioned room next to the metallurgical laboratory. Each instrument is identified as to the furnace or generator it controls. Recording and indicating charts face the control room windows for convenience in checking without entering the air-conditioned room.



ZINC diecast handles and knobs plated directly with Crack-Free chromium. Handle at top shows matte grey color of deposited chromium. Parts below have been buffed to high luster.

No undercoating—

NEW Chrome Finish Cuts Part Handling and Cleaning

By T. P. McFARLANE,
Laboratory Director,
American Hardware Corp.,
New Britain, Conn.

◆ A low cost, low investment chromium plating bath has answered the need for getting into production fast with a new line of builders' hardware . . . The Crack-Free process requires no copper or nickel undercoating.

◆ The method provides a good finish, reduces part handling and avoids difficulties involved in chrome plating zinc diecastings . . . Although an extra buffing operation is needed, the softer chromium deposit buffs easily to a bright finish.

◆ MANUFACTURERS generally consider zinc diecastings troublesome to chrome finish. One of the major difficulties is the need for very careful cleaning of zinc diecastings before plating. If this is not done, peeling and blistering of the plate frequently takes place.

This problem is completely avoided in a new type of chrome plating bath. Parts that would be considered insufficiently cleaned for quality chrome plating by conventional methods are plated easily in Crack-Free chromium.

The Crack-Free process deposits chrome directly on base metal without requiring a copper and nickel undercoating. Although an extra buffing operation is needed for a high luster decorative finish, the method is easier than conventional copper-nickel-chromium plating of zinc diecastings where the parts lend themselves to buffing.

By using this new type of chrome plating bath, American Hardware Corp. was able to (1) go into production on a new product line fast, (2) avoid major expenditures for additional plating equipment, (3) substantially reduce part handling and cleaning, (4) avoid some of the difficulties associated with zinc diecastings and (5) obtain a highly satisfactory finish.

American Hardware manufactures a complete line of builders' hardware under the trade names of P. & F. Corbin, Russell & Irwin and Corbin Cabinet Lock. The sales situation in this field makes life difficult for the plating department, which must provide an eye-appealing finish for the product. The product line includes hundreds of different items to meet the varying needs of builders in different parts of the country. Some items have long production runs; others require only periodic short runs.

Styles change rapidly

A further complication results from style changes and fads in builders' hardware. To stay on the profit side of the ledger, it is necessary to swing rapidly into production on popular styles —and just as rapidly drop styles that have lost public favor.

To deal with this situation, the plating de-

RACKED parts being inserted in CF-500 plating solution. About 0.3 mil of Crack-Free chromium is deposited during 15-min. plating cycle.

partment must balance efficiency with economy. Just such a "balance" problem arose when the company readied a new line of kitchen cabinet hardware for production. The plating department was required to provide several attractive finishes for two sizes of zinc diecast handles and knobs. One of the desired finishes was bright chromium. The problem was: what equipment to use?

Since the company has extensive plating facilities it would seem that the new product should present no problem. However, it did not have a readily available automatic setup for the conventional copper-nickel-chromium cycle necessary for plating zinc die castings. Also, facilities for manual plating zinc diecast parts in still tanks were limited and involved restringing between the nickel and chromium plating operations. This type of operation would have meant considerable handling costs for a part that would have to "buck" a highly competitive market.

Conventional bath not practical

Chrome plating the parts directly in a conventional chrome solution was also considered. However, the time involved in obtaining a thick enough chrome deposit for sufficient wear and protection, plus the difficulty in color buffing such a heavy chrome deposit, made this method impractical.

One answer would have been to purchase new automatic equipment. But the economics of the situation were such that the investment could not be justified in view of the sales potential of the new product line. However, it was highly desirable to manufacture the new line—if it could be done economically.

About this time (late 1954) American Hardware learned of the new chrome plating process recently developed by the United Chromium Div. of Metal & Thermit Corp. Later called "Crack-Free" chromium when announced in April 1955, the process uses a new type of bath designated as Unichrome CF-500, which incorporates automatic regulation of the catalyst concentration. The process was claimed to deposit a plate free of the structural imperfections characteristic of conventional chromium.

Get good throwing power

If the new process would work for zinc diecastings, it would solve the problem. With a one-step plating operation and no heavy expenditure for equipment, a manual setup could be made both efficient and economical. A pilot operation was set up to prove out the process.

Laboratory results were entirely satisfactory. The plating operation itself proved to be simple and trouble-free. The bath was easy to make up and maintain and had good throwing power. Since the CF-500 both deposits a chrome plate with a characteristic matte-grey finish, a buffing operation was required. The deposit obtained is somewhat softer than the normal bright type of chromium deposit and when properly applied buffs easily to a bright lustrous finish.

Setup full scale line

Outdoor exposure and humidity tests were made on plated parts. Standard Signal Corps humidity tests were used. Handles and knobs plated with Crack-Free chromium were placed in a humidity cabinet and exposed to air at 95 pct of relative humidity and at 65 to 150°F for 480 hours. When results of both tests were good a full scale production line was set up.

On this line rough zinc diecastings are delivered first to a Packer-Matic automatic buffer before going to the plating room. The cycle on this machine consists of a 3 to 5 min. buff, after which they are cleaned with trichlorethylene in a vapor degreaser before going to the plating department.

One man handles the plating operation. The plating tank is a 375-gal unit that accommodates 13 racks per cycle; with 12 pieces per rack, it takes a total of 156 pieces per cycle. The bath is kept at 150°F, and the current density averages 3 amps per sq in. Fifteen minutes are required to deposit 0.2 to 0.3 mil of chromium.

At the end of the plating cycle, the racks are given successively a reclaim or "dragout" rinse to recover the bath solution that is dragged out

with the racks; a cold-water rinse; a hot-water rinse; and finally are dried off with a stream of compressed air. At this point the finish has the matte light grey color. Plated parts are unracked and returned to the Packer-Matic for a final buffing to obtain the desired high luster. The buffing operation removes approximately 0.1 mil of the deposit, leaving a comparatively heavy chromium plate of 0.1-0.2 mil for wear and corrosion protection.

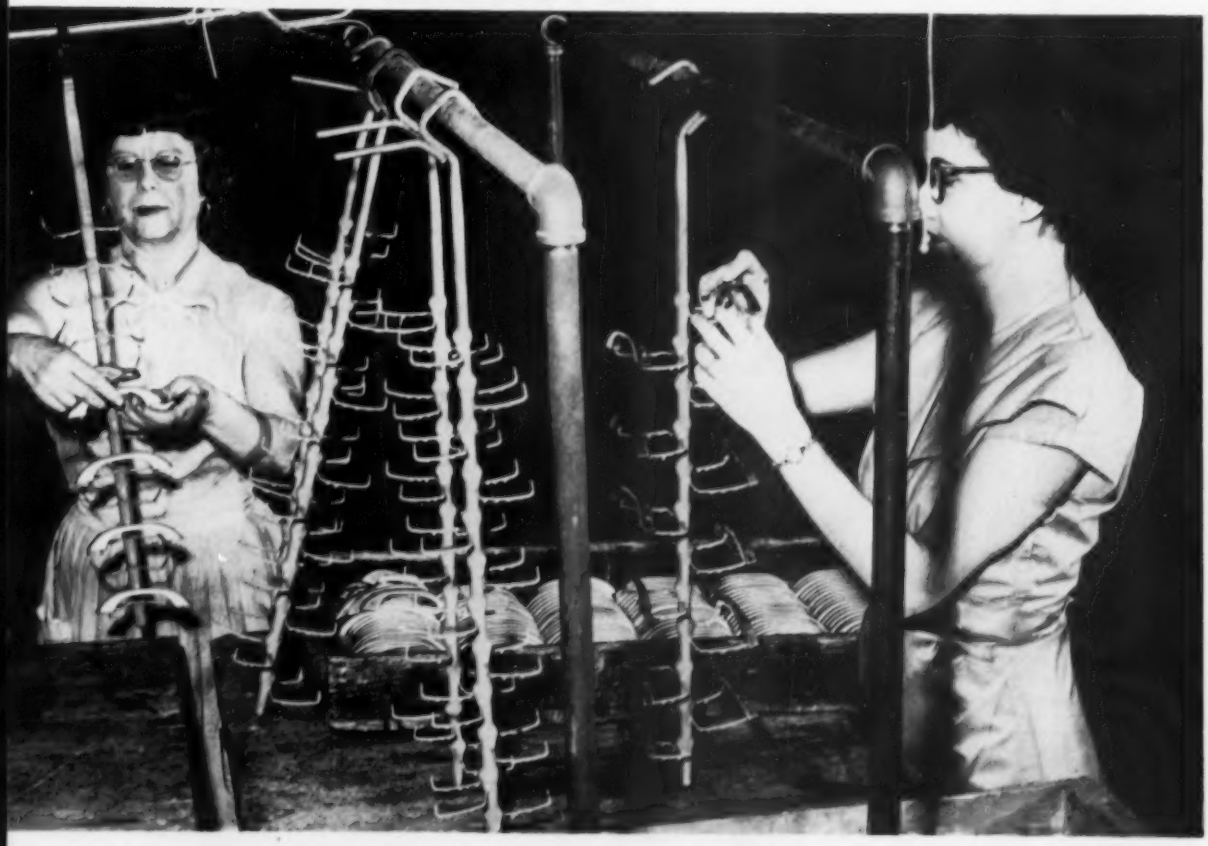
Cycle allows racking time

Since the entire sequence of operations in the plating room consists of a 15-min. plate followed by a few seconds rinse, the operator has sufficient time to help rack parts preparatory for plating and unrack the plated parts during the plating period.

Setting up and maintaining the plating bath is quite simple. The only material used for makeup and maintenance is the CF-500 compound. It is packaged as a dry mix in 100-pound containers and the solution is prepared by dissolving the CF-500 material in water to a density of 25 to 26° Baume. The solution is of the self-regulating type in which a catalyst is used and it maintains itself automatically. Production control of the bath is consequently reduced to periodic checks of the density of the solution with a hydrometer.

An interesting sidelight on Crack-Free chromium is the fact that, with a little experience, visual examination of the plated parts can be used as a means of quality control. The deposit has a distinct appearance and quality as plated. For instance, a pearly light cast means that the chrome will be easy to buff. A uniform dark grey will be more difficult to buff and indicates that the current density or temperature may be off in the bath.

As a result of the versatility and ease of operation of the new plating process, American Hardware is now investigating other applications. It holds promise for direct plating of brass and bronze that requires a dull chrome finish. A fairly heavy plate can be deposited fast; being matte grey to start and because it can be scoured easily, the desired dull chrome finish is easy to obtain. Zinc diecast luggage hardware is another product class for which the process may find suitable application on a production line basis.



UNRACKING plated parts after they have been dried with compressed air hose. Racks are protected against corrosion by a plastisol coating.

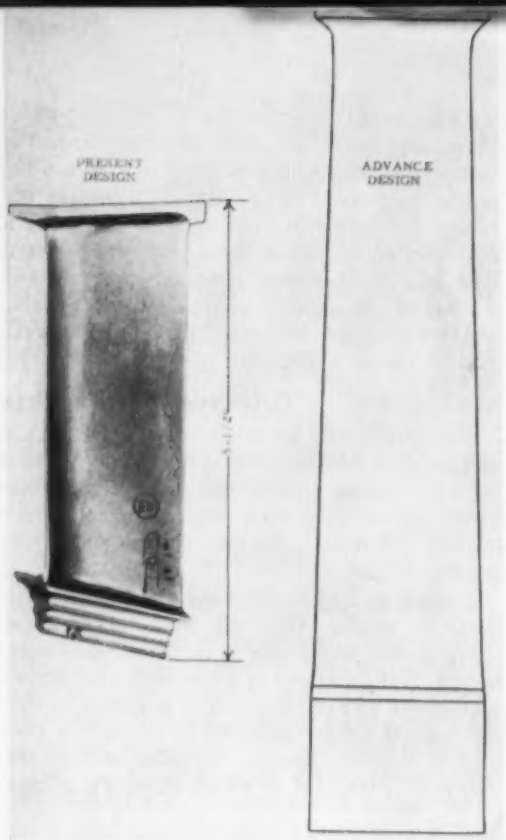
Cost is problem—

Aircraft, Auto Engine Trends Challenge Investment Casters

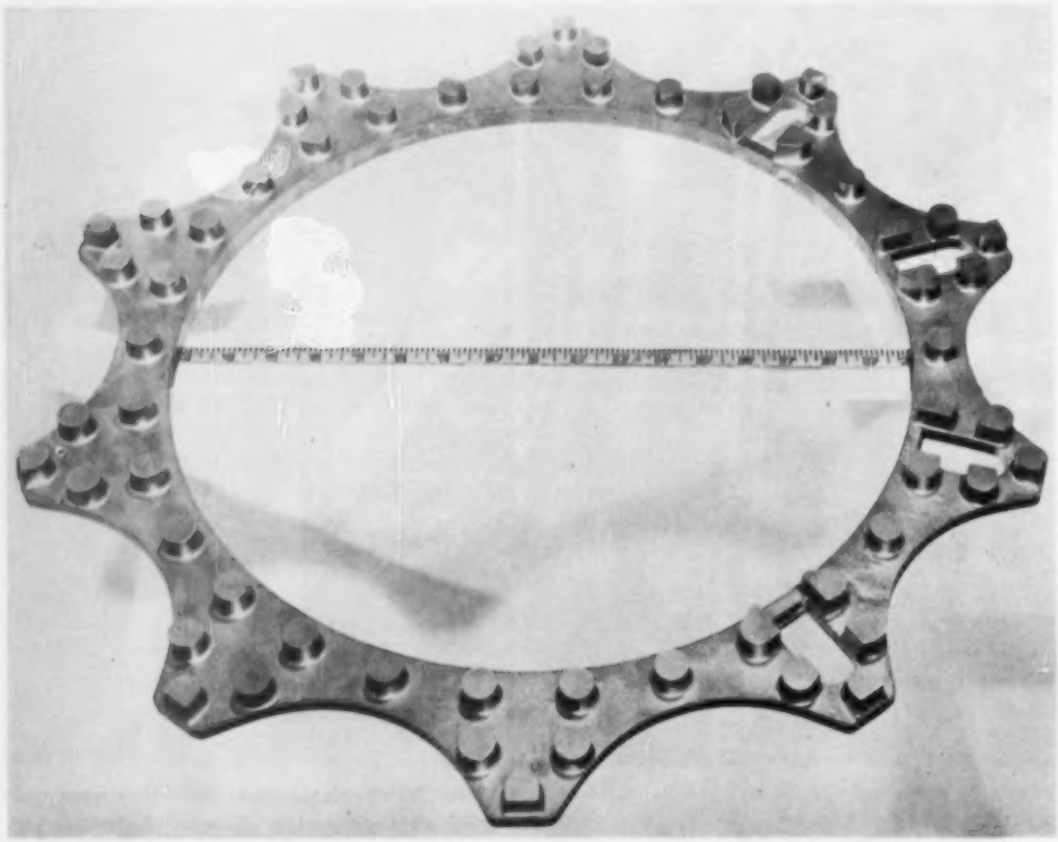
◆ Parts for aircraft jet engines are getting bigger and more complex . . . And the future of the gas turbine for cars depends in large measure on low-cost, heat-resistant cast alloys.

◆ Both of these problems were tossed at the investment casting industry recently . . . Despite progress in this casting technique, the demand is for more and faster headway to keep pace with design trends.

By W. G. PATTON, Engineering Editor



SIZE of present shrouded turbine bucket is considerably smaller than advanced design.



BURNER support for the J-71 turbo-jet engine is investment cast from type 310 stainless.

◆ THE INVESTMENT CASTING industry will have to make substantial technological progress during the next few years if it is to meet the exacting requirements of the aircraft and automobile industries.

Aircraft engineers will want bigger, more complex parts for jet engines. And gas turbine engineers in the auto industry are thinking about turbine blades that cost "15¢ plus the cost of materials." Moreover, they want the materials to be inexpensive, non-critical, air-melting alloys.

These are just two of the many challenging problems that face their industry, members of the Investment Casting Institute were told at a series of technical sessions held in Detroit recently.

A paper presented by Dean K. Hanink, chief metallurgist, Aircraft Engine Operations, Allison Div., General Motors Corp., emphasized the need for technical improvements. He stated that aircraft power plant designers are fully aware of the diversified casting configurations that can now be incorporated in engines. But they want assurance that such parts will be foundry engineered with full consideration of performance and durability requirements.

The speaker cited one reason why cast alloys may be particularly attractive to aircraft engineers. He showed that the average stress rupture life of a cast nickel base super alloy for turbine buckets was more than twice that of currently available nickel base forgings, and many times that of a cobalt base forging.

Permit weight savings

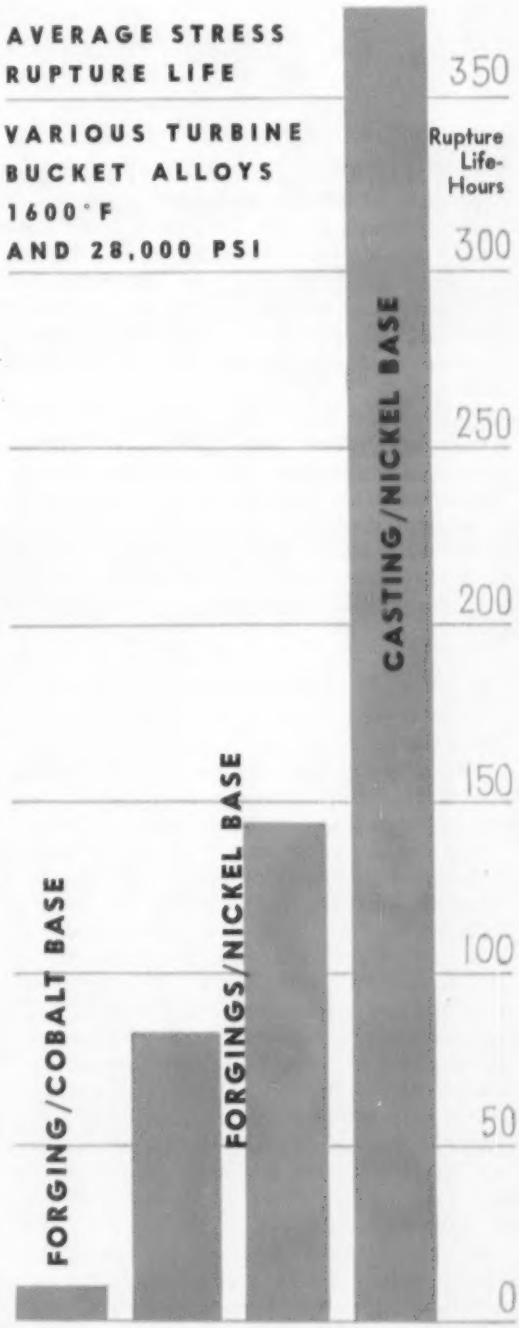
Substantial weight savings are also possible with investment castings, Hanink said. He mentioned that an experimental turbine part weighed 240 lb as a forging, 138 lb as a conventional casting, and then said that precision casting would permit a further weight reduction to only 108 lb. Similarly, a burner support that weighed 80 lb as a forging was cut to 15 lb in cast form.

Design trends for improved turbine-bucket performance include not only shrouded configurations but long, thin airfoil sections; these will probably be more difficult to make by investment casting methods.

Dr. Donald Frey, of Ford Motor Co., indicated that the auto industry is progressing in its battle against high cost materials and methods for making gas turbine power plants, but aims are far ahead of present accomplishments. He emphasized that practical considerations dictate a cost for individual turbine blades not to exceed 15¢ over the price of the material used.

To hold costs within this limit, Dr. Frey suggested that wax patterns may have to be abandoned in favor of some other precision casting process such as shell molding. He said that with shell molding, Ford is currently making 300 rocker arms in a single casting operation.

The auto industry's search for a low cost material is based on the hope of finding an iron base alloy containing no cobalt and little or no nickel, Dr. Frey said. The alloy must withstand a temperature of 1350°F. Iron-aluminum alloys show promise for auto gas turbine blades, provided they can be airmelted. The speaker indicated that Ford has air-melted such alloys that contain up to 12 pct Al.



Close tolerances held—

Cold Rolling Forms Splines at Fast Rate

◆ Cold rolling steel parts to final dimensions has assumed a prominent place among metal forming processes . . . In a short time, it has established itself as a high-speed method for producing splined shafts to finish tolerances at low cost.

◆ Using the rack-forming method, Ford has splined more than 2 million axle shafts in less than 200 working days . . . Shafts are stronger and quality is higher . . . One machine turns out more than 270 an hour.

◆ COLD FORMING steel forgings to final dimensions without subsequent machining is gaining ground rapidly as a mass-production technique. Machines capable of cold-rolling splines at pressures in excess of 200,000 psi were announced only 18 months ago (IRON AGE, June 24, 1954). Yet in this relatively short time, their use has pushed production to a new high level.

In less than 200 production days, the Ford Motor Co.'s Mound Road plant in Detroit has cold-rolled splines on more than two million rear axle shafts. The facts appear to substantiate the belief that the rack-forming method of plastic deformation in metals produces higher quality at substantially lower manufacturing cost than machining operations conventionally used.

Offers several advantages

Three spline-rolling machines turn out 11,500 shafts daily. A fourth Roto-Flo machine, a stand-by, is also used for experimental work. The rack-forming method is used on all machines, developed by Michigan Tool Co., Detroit.

Cold rolling of rear axle shafts by the Roto-Flo process provides a number of manufacturing advantages: (1) Tooth strength and surface finish are improved, (2) Rolled splines are produced with a 3 to 6 microinch rms finish, markedly better than teeth formed by other processes, (3) Lower manufacturing costs, (4) Tool cost per piece is slashed, (5) Floor space requirements are lower, (6) Capital investment in machinery is cut, (7) No chip removal facilities or chip handlers are required.

Axle splines are rolled at a faster rate by the rack-forming process. Splines are produced to final dimensions in 10 seconds on parts of similar diameter.

Service life of forming racks runs about 150,000 splines before regrinding is needed. Initially, high-carbon, high-chrome steel racks were employed. New racks made of special alloy steels now promise an even longer production life between grindings.

Before use of the rack forming machines, designers specified a 17-tooth, 16/32-in. diametral pitch spline on the rear axle. This was changed to a 28-tooth, 24/48-in. diametral pitch spline to take full advantage of the cold-rolling process. The alteration permitted increased manufacturing efficiency, in addition to greater strength of the axle in service.

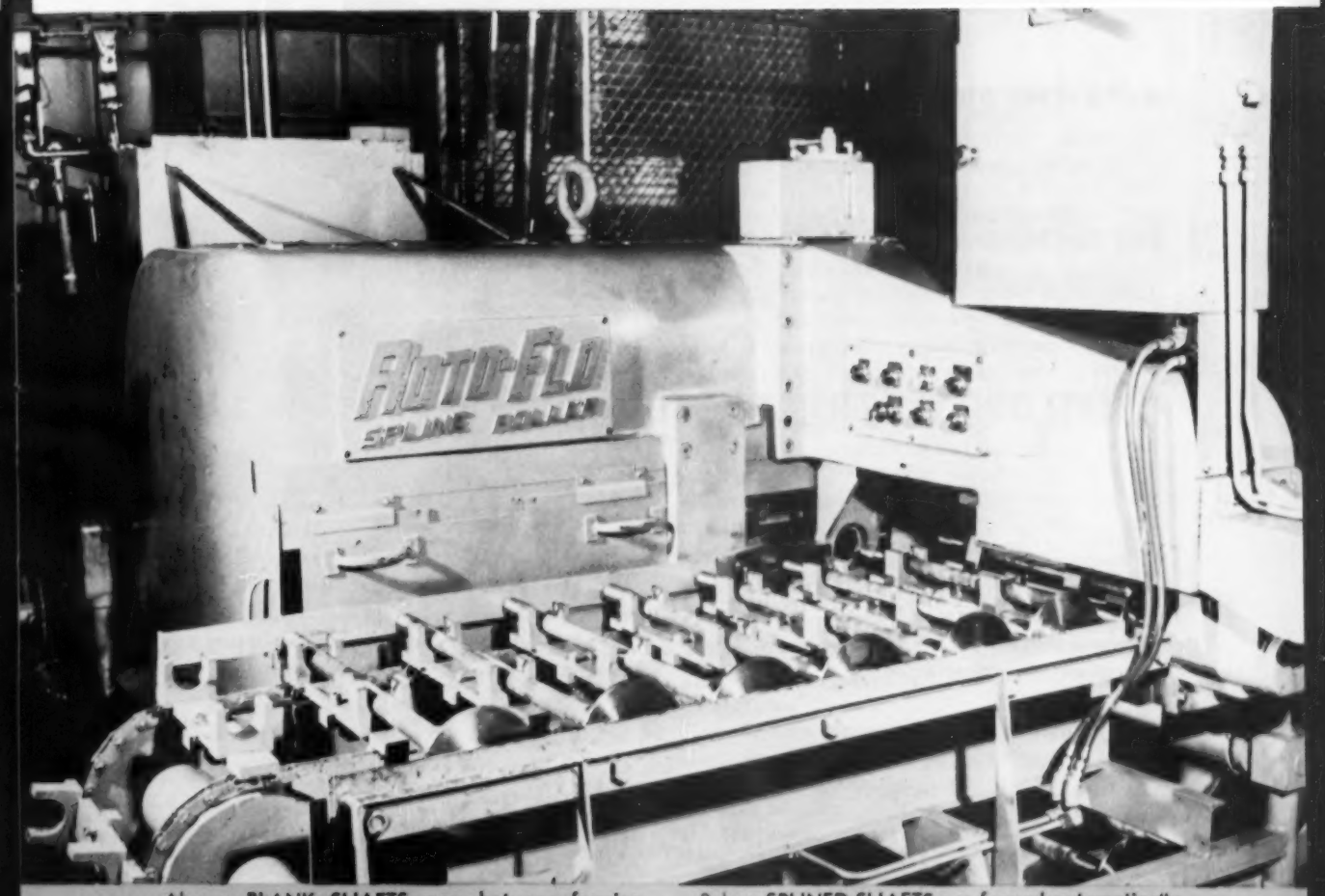
Originally, manual-loading spline rollers were installed. Early production figures were attained with the original installation. With trial runs completed, the machines are being converted one at a time by installation of automation equipment.

The operator takes the shaft blanks from an overhead trolley conveyor and loads them into V-shaped carrier slots. Once loaded, further attention is unnecessary. Parts are returned by the machine conveyor to the loading station.

The operator hangs the splined shafts on the overhead conveyor, which carries them to the heat-treat operation that follows. Heat treatment is carried out with the same time cycle and high-speed induction equipment used before the cold forming was adopted.

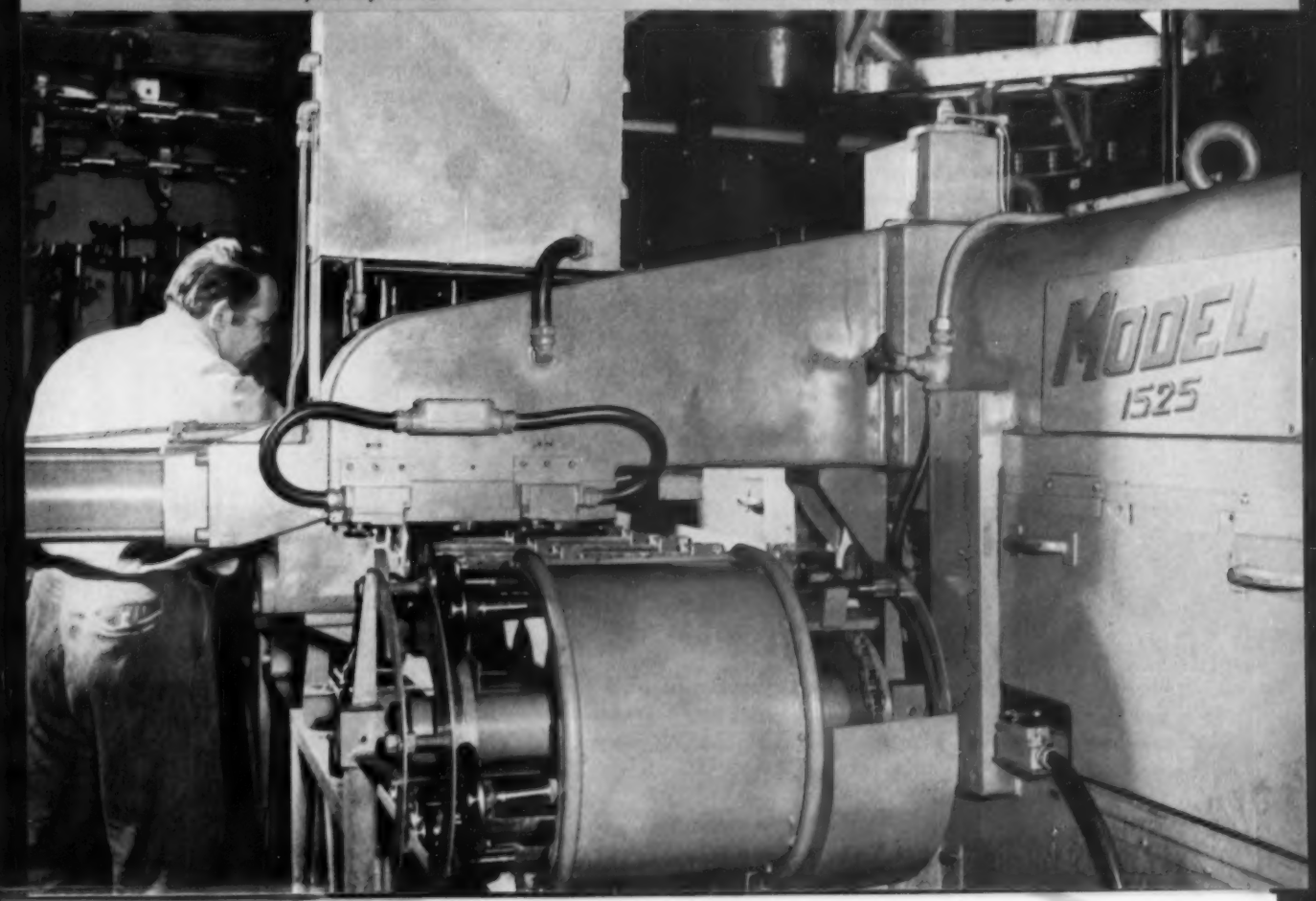
Production rate for the automated equipment is about 300 splined shafts per hour for each machine at 100 pct efficiency. The actual production rate comes very close to the machine's rated capacity (90 pct or better) without burdening the operator.

Quality of the finished cold-rolled spline is high. Cross-section area of the spline teeth is 15 pct greater than that achieved on a blank of the same size which is splined by hobbing. Average minor diameter (from tooth root to tooth root) has been increased from 1.045 in. to 1.123 in. Average major diameter has been increased from 1.169 in. to 1.206 in. providing additional strength for the rear axle shaft.



Above: **BLANK SHAFTS** pass between forming racks, hidden by safety covers.

Below: **SPLINED SHAFTS** are formed automatically at 270 an hour. Racks last through 150,000 shafts.



Get better black plate—

Proper Rinsing Practice Curbs Pinpoint Corrosion

◆ Pinpoint corrosion has plagued the steel industry —first, because of the difficulty to avoid it and second, loss due to it ran high . . . Investigation now shows that rust of this type can be influenced by rinse water composition.

◆ In rinsing, this defect can be reproduced by using low concentrations of alkali plus certain anions—the worst being chloride . . . Rinsing off offending ions with distilled water or steam condensate will prevent this form of corrosion.

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SAMUEL SPRING, Laboratory Group Leader,
W. J. HENNESSEY, Sales Supervisor,
Pennsylvania Salt Mfg. Co., Wyndmoor, Pa.

◆ OCCASIONAL occurrence of rust spots on cold reduced steel after cleaning is a particularly troublesome problem in steel mills. Moreover, it's virtually an industry-wide problem running into considerable loss. It is now known that pinpoint rusting is influenced by rinse water composition and can be avoided.

Cause of this defect has centered speculation principally on cleaning compounds and hard water. Insoluble residues precipitated on the steel were believed to be somehow responsible. Humidity in the air has also been blamed because pinpoint rust occurs in high incidence during late summer when humidity is abnormally high. It is also true that seasonal variation in many water supplies results in high dissolved solids content at this same time of year.

The specific form of the corrosion varies somewhat. At times, it is feathery; sometimes more in the form of many small pits. The micrographs in Figs. 1 and 2, made from plastic replicas (Faxfilm), illustrate the forms of corro-

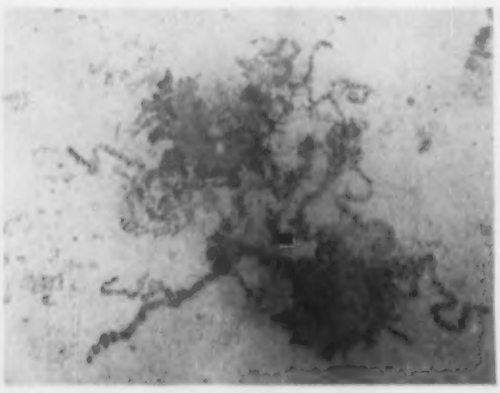


FIG. 1—Micrograph made from plastic replica shows representative corrosion of steel samples submitted by the steel industry.

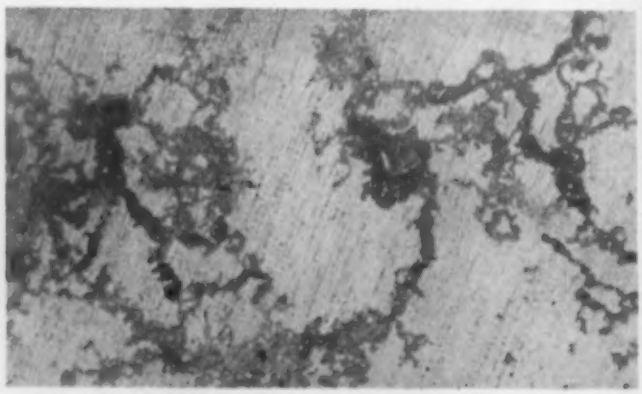


FIG. 2—Pinpoint rust shown in this micrograph, made from a Faxfilm replica, is typical of the type formed by laboratory methods.

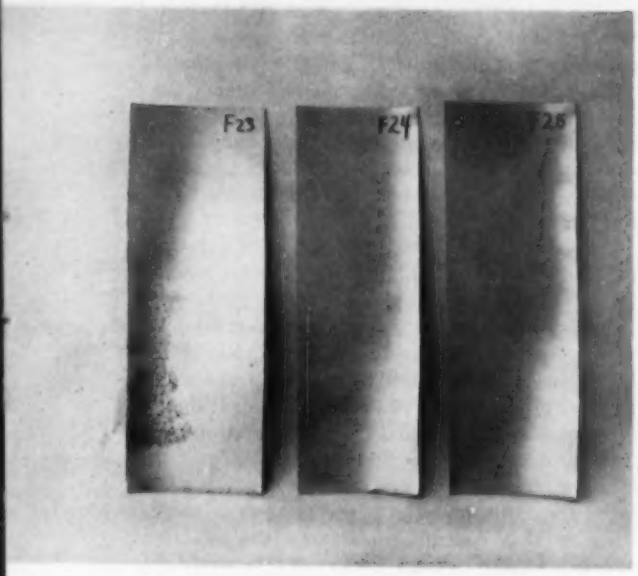


FIG. 3—Panel at left (F23) shows pinpoint corrosion after rinsing in 300 ppm hard water and 250 ppm alkaline salt. No rust appeared when black plate panels received final rinse in distilled water (F24) or steam condensate (F25).

sion. Fig. 1 is representative of steel samples submitted by steel mills whereas Fig. 2 is a typical panel prepared by laboratory methods.

Steel samples, taken directly after cold reduction, were supplied by four different mills. These were cut into 4-in. x 6-in. panels for investigation by one method, and 7-in. x 10-in. panels for another method.

The two investigation methods used were similar, their principal difference being that in Method A pinpoint rust was formed by simple exposure to humidity. In Method B, panels were box annealed, then exposed to humidity. In both methods, steel was electro-cleaned in commercial sodium orthosilicate, rinsed and either air blast dried or allowed to drain dry.

Test emphasis on rinsing

By Method A, panels so treated were immediately exposed to approximately 92 pct relative humidity at room temperature over saturated ammonium dihydrogen phosphate in a desiccator.[1] Exposure for 16 to 24 hours was usually sufficient for formation of clearly visible pinpoints of rust.

In Method B, panels were box annealed in commercial equipment in a reducing atmosphere, returned to the laboratory, examined, exposed to humidity and re-examined.

Emphasis in this work was placed entirely on rinsing. Cleaned panels were first rinsed in relatively soft water before being subjected to various special rinses.

Tests on steel prior to annealing (Method A) showed a pitting-type corrosion, similar in appearance to some examples of pinpoint rust from the field. It formed on exposure to humidity if a certain combination of circumstances was met. Table I illustrates this.

Panels rinsed in distilled water bore only a trace of rust on exposure. On the other hand, a heavy, quite uniform rust was caused by a hard water rinse (150 parts per million) prepared from calcium chloride and magnesium sulphate. Rinsing in slightly alkaline hard water resulted in a definite pinpoint or pitting-type rust similar to that shown in Figs. 1 and 2.

Certain anions are largely responsible for rusting by such combinations of hard water and alkali. This is indicated by Table II. These tests show that chloride, sulphate and nitrate are the corrosive ions in the system. Hydroxide, phosphate, carbonate, bicarbonate and silicate were relatively non-corrosive when used alone at concentrations of about the same order of magnitude.

Other tests showed that the source of alkalinity in rinse water containing harmful anions had no effect on the ensuing corrosion. As long as both harmful anions were present, the particular type of corrosion always occurred. Data from these tests are given in Table III.

Tests by Method B were designed specifically to study the pinpoint rust problem encountered in the field. Each condition listed in the Tables IV to VII represents results obtained on steels from three or four different sources.

Reducing atmosphere lowers rust

Very good correlation exists between the two methods. Table IV shows that the same conditions predisposing steel to the pitting type corrosion on exposure to humidity can also be responsible for pinpoint rust occurring on box annealed steel. The heavy streak rust formed under certain conditions is, however, largely dissipated during the annealing process in a reducing atmosphere.

As in Method A, it is obvious from Table V that certain anions are harmful. Pinpoint-type rust resulted on steel rinsed in slightly alkaline water containing chloride, sulphate or nitrate. None occurred when only the alkaline salt was present. This table also shows that the cations, calcium and magnesium are not responsible for this corrosion.

The source of alkalinity, as shown by Table III, was also inconsequential. As long as both the harmful ions and slight alkalinity were present in the rinse water, pinpoint rust developed regardless of whether the alkaline salt was in the form of sodium hydroxide, sodium silicate or sodium carbonate. Even the slightest alkalinity produced by sodium bicarbonate or

some incompletely soluble calcium and magnesium compounds was sufficient to produce pinpoint type corrosion on annealed steel when chloride ions were present.

On annealed steel, chloride was by far the most harmful anion. Nitrate was moderately harmful, while sulphate produced only slight pinpoint rust in alkaline rinses.

Having established the probable cause of pinpoint corrosion, attention turned to its prevention. First efforts were directed toward removal of the offending ions by rinsing. Table VII shows that such practice is feasible. Following rinses in hard water, alkaline hard water or alkaline sodium chloride with distilled water or steam condensate resulted in virtually complete absence of corrosion on annealed samples. The contrast is also shown in Fig. 3.

Alkalinity source not critical

Method A gave some indication that certain materials, when added to a harmful rinse, might significantly reduce susceptibility of the steel to formation of pinpoint rust. The most effective materials were sodium nitrite, sodium cyanide and sodium dichromate. Increasing the concentration of alkali to 3 to 4 g per liter also significantly reduced the tendency to rust on exposure to humidity. None of these additions were beneficial, however, on subsequently box annealed steel.

Formation of pinpoint rust by combinations of alkali and anions probably accounts for the variable nature of the defect, since many water supplies are known to vary seasonally in anion composition. Both dissolved solids in the water and humidity in the air are generally high at about the same time of year at which incidence of pinpoint rust is greatest.

Coming as it does at only certain times of the year, the use of moderate quantities of deionized water or steam condensate as a final rinse might go far toward elimination of pinpoint rusting.

Particularly important is the conclusion that the source of alkalinity is not critical. Alkalinity could be furnished by cleaner dragout or even by alkalinity normally present in the water supply, alkaline and bicarbonate waters being fairly common.

An explanation of the formation of pinpoint rusting may be postulated by considering the mechanism of corrosion.

Resistance of stainless steel to corrosion is attributed to a protective oxide film. Yet stainless steel is quite sensitive to pitting corrosion in the presence of chlorides. Passivation of steel has been explained by the formation of a thin protective oxide film formed on iron in alkaline solutions.[2, 3] Furthermore, it is postulated that iron phosphate forms at discontinuities in this coating, indicating the reactive nature of these areas.[4]

It is hypothesized, then, that partial inhibition toward corrosion is attained by formation of a discontinuous oxide film at the low alkali concentrations. Also, that localized corrosive action at the active discontinuities by the normal electrochemical mechanism of corrosion is responsible for pinpoint rust.

Just when this corrosion takes place on annealed samples is uncertain. It was generally clearly visible on return of the annealed samples to the laboratory, being aggravated somewhat by further exposure to humidity.

Variation in the pinpoint type rust did exist. It was generally more uniformly distributed on panels simply exposed to humidity than on the annealed panels. However, variation in steel and treatment also appeared to affect distribution, size and frequency of the corroded areas. On annealed panels, the corrosion often appeared as etched spots rather than as actual

TABLE

Effect of Rinse Water on Type of Rust

(Steel panels later exposed to 92 pct relative humidity at room temperature for 24 hours.)

Test No.	Composition of Rinse	Type of Rust
1	Distilled water	Trace only
1	150 ppm hard water*	Heavy streak rust
1	150 ppm hard water + 250 ppm alkaline salt	Pinpoint or pitting type
2	Distilled water	None
2	150 ppm hard water	Heavy streak rust
2	150 ppm hard water + 250 ppm alkaline salt	Pinpoint or pitting type
2	150 ppm hard water + 500 ppm alkaline salt	Pinpoint or pitting type
2	300 ppm hard water + 500 ppm alkaline salt	Pinpoint or pitting type
2	300 ppm hard water + 1000 ppm alkaline salt	Pinpoint or pitting type
2	75 ppm hard water + 250 ppm alkaline salt	Pinpoint or pitting type

* Hard water = $CaCl_2$ + $MgSO_4$; Ca:Mg = 3:2

TABLE II

Effect of Anions in Rinse Water on Rust Formation

(Steel panels later exposed to 92 pct humidity at room temperature.)

Composition of Rinse	Types of Rust
300 ppm sodium chloride	Heavy streak rust
300 ppm sodium chloride and 500 ppm alkaline salt	Pinpoint or pitting type
300 ppm sodium nitrate	Streak rust
300 ppm sodium nitrate and 500 ppm alkaline salt	Pinpoint or pitting type
500 ppm sodium sulfate	Heavy streak rust
500 ppm sodium sulfate and 500 ppm alkaline salt	Pinpoint or pitting type
250 ppm sodium hydroxide	None to trace
250 ppm sodium carbonate	None to trace
250 ppm sodium bicarbonate	None to trace
250 ppm trisodium phosphate	None to trace
250 ppm sodium silicate	None to trace

TABLE III

Effect of Alkalinity Source on Pinpoint Corrosion

(Alkaline hard water rinse. Steel later exposed to 92 pct relative humidity at room temperature.)

Test No.	Composition of Rinse	Type and Extent of Rusting
1	Distilled water	None
1	150 ppm hard water*	Slight streak rust
1	150 ppm hard water* + 250 ppm alkaline salt	Moderate pinpoint rust
2	Distilled water	None
2	300 ppm hard water*	Trace streak rust
2	300 ppm hard water* + 250 ppm alkaline salt	Moderate pinpoint
1	250 ppm alkaline salt	None — trace
3	250 ppm alkaline salt	None — trace

* Hard water = $CaCl_2$ and $MgSO_4$; Ca:Mg = 3:2

TABLE IV

Effect of Rinse Composition on Pinpoint Rusting

(Using annealed black plate)

Composition of Rinse	Type of Rust
150 ppm hard water* + sodium hydroxide(1g/1)	Pinpoint or pitting type
150 ppm hard water* + sodium carbonate (1g/1)	Pinpoint or pitting type
150 ppm hard water* + sodium phosphate (1g/1)	Pinpoint or pitting type
150 ppm hard water* + sodium silicate (1g/1)	Pinpoint or pitting type
150 ppm hard water* + sodium magnesium carbonate (g/1)	Pinpoint or pitting type

* Hard water — $CaCl_2$ and $MgSO_4$; Ca:Mg = 3:2

TABLE V

Effect of Anions and Cations in Rinse Water on Occurrence of Pinpoint Rust

(Annealed Black Plate)

Composition of Rinse	Type and Extent of Rusting
Alkaline salt alone (250 ppm)	None — trace
Hard water* + alkaline salt (250 ppm each)	Moderate pinpoint
NaCl + alkaline salt (250 ppm each)	Heavy pinpoint
Na_2SO_4 + alkaline salt (250 ppm each)	Very slight pinpoint
$NaNO_3$ + alkaline salt (250 ppm each)	Slight to moderate pinpoint
$Ca(OH_2)$ alone (250 ppm)	None to trace
$MgCO_3$ alone (250 ppm)	None to trace

* Hard water = $CaCl_2$ and $MgSO_4$; Ca:Mg = 3:2

rust. Similar variations have been noted on submitted field samples.

It was possible to reduce or prevent corrosion of panels treated by Method A by modifying the rinse with certain addition agents. This could not be done on panels treated by Method B. On the other hand, alkaline sulphate rinses appeared to be less harmful on annealed steel than on steel immediately exposed to humidity. Rusting by chloride, nitrate or sulphate ions alone was severe on steel not subsequently annealed.

Corrosion of black plate, other than the pinpoint type, would no doubt also be reduced by a final deionized rinse. Less rust resulted on annealed black plate rinsed in distilled water than on that rinsed in hard water containing chlorides and sulphates. This superficial rust, which formed quickly on steel rinsed in water containing chlorides, sulphates and nitrates was largely, but not completely, dissipated during the annealing process. This may account for the streak or stain type of rust which sometimes occurs.

TABLE VI

Effect of Sources of Alkalinity in Rinse Water

(Occurrence of pinpoint rust on annealed black plate.)

Composition of Rinse	Type and Extent of Rusting
300 ppm hard water* + sodium bicarbonate (500 ppm)	Heavy pinpoint
300 ppm hard water* + sodium silicate (250 ppm)	Moderate pinpoint
300 ppm hard water* + sodium hydroxide (250 ppm)	Moderate pinpoint
250 ppm NaCl + sodium bicarbonate (500 ppm)	Heavy pinpoint
250 ppm NaCl + sodium silicate (250 ppm each)	Heavy pinpoint
250 ppm NaCl + calcium carbonate (250 ppm each)	Heavy pinpoint
250 ppm NaCl + magnesium carbonate (250 ppm each)	Heavy pinpoint

* Hard water = $CaCl_2$ and $MgSO_4$; Ca:Mg = 3:2

TABLE VII

Effect of Final Rinse on Rust Formation

(Using distilled water or steam condensate on annealed black plate.)

Test No.	Composition of Rinse	Type and Extent of Corrosion
1	300 ppm hard water*	Trace streak rust
2	Test 1, followed by distilled water rinse	None
3	300 ppm hard water* and 250 ppm sodium silicate	Moderate pinpoint
4	Test 3, followed by distilled water rinse	Trace
5	Test 3, followed by steam condensate rinse	None
6	300 ppm hard water* and 500 ppm sodium bicarbonate	Heavy pinpoint
7	Test 6, followed by distilled water rinse	None
8	500 ppm NaCl and 250 ppm sodium silicate	Very heavy pinpoint
9	Test 8, followed by distilled water rinse	None

* Hard water = $CaCl_2$ and $MgSO_4$; Ca:Mg = 3:2

REFERENCES

1 Wink, W. A. and Sears, G. K., Instrumentation Studies LVII Equilibrium Relative Humidities Above Saturated Salt Solutions at Various Temperatures, TAPPI 33, No. 9, 96-99A, Sept., 1950.

2 Pryor, M. J. and Cohen, M., The Inhibition of the Corrosion of Iron by Some Anodic Inhibitors, Jour. Electrochem. Soc., 100, 203-215, 1953.

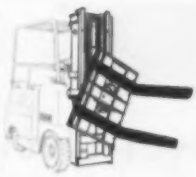
3 Pryor, M. J. and Cohen, M., The Mechanism of the Inhibition of the Corrosion of Iron by Solutions of Sodium Orthophosphate, Jour. Electrochem. Soc., 98, No. 7, 263-272, 1951.

4 Pryor, M. J., Cohen, M. and Brown, F., The Nature of the Films Formed by Passivation of Iron with Solutions of Sodium Phosphate, Jour. Electrochem Soc., 99, No. 12, 542-545, 1952.

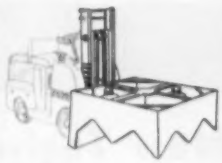
Crane Arm

Hydraulic or Mechanical Scoop

Side Shifter

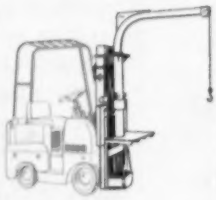


Revolving Carriage

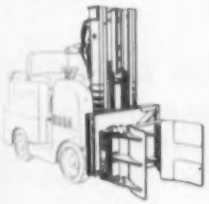


Multiple Drum Carriage

Dual Telescopic Mast

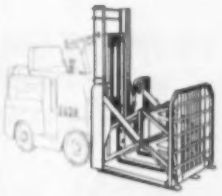


Cotton Boom



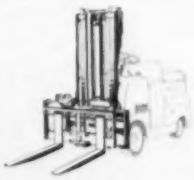
360° Rotating Carriage and Clamp

Ram



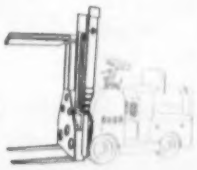
Unloader

Brick and Block Forks

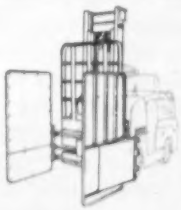


Swing Shift

Garrett Breakout



Load Stabilizer



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Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 121.

Safety clothing

"Asbestos Safety Clothing" is a 12-page booklet just issued. It describes in detail the various articles of safety apparel manufactured and supplied by Johns-Manville. These include: asbestos suits, helmets, aprons, leggings, overshoes and gloves and mittens specially treated to increase their resistance to heat. oil, water and abrasion. The booklet also covers fire smothering blankets used by fire trucks, safety patrols and truckers. *Johns-Manville.*

For free copy circle No. 2 on postcard, p. 121

Punch presses

Two new brochures discuss in detail four new models of punch presses. Description is included on a 1½ ton standard press; a 1½ ton, 7 in. deep throat press of the rigid rib style; a 7½ ton standard press; and a 7½ ton, 12¾ in. deep throat press of the rigid rib style. Construction features such as rugged frame, trouble-free crankshaft, driving mechanism, ram guides, ram hole, and single-trip mechanism are also covered. *Kenco Mfg. Co.*

For free copy circle No. 3 on postcard, p. 121

Switchboards

How General Electric's "building block" concept is applied to switchboards is described in a new 40-page bulletin, "Switchboards With Basic Circuits." The publication shows how eight classifications of standard switchboards are constructed, operated and tested, as well as discussing basic circuit specifications in duplex switchboards. *General Electric Co.*

For free copy circle No. 4 on postcard, p. 121

Grinding wheels

Comprehensive catalog for selecting grinding wheels for the common operations. Sections on: general purpose, tool room, internal, cylindrical, centerless, cut off, surface, snagging and disk grinding. *The Peninsular Grinding Wheel Div., Abrasive and Metal Products Co.*

For free copy circle No. 5 on postcard, p. 121

FREE TECHNICAL LITERATURE

Mechanical seals

Complete information on Garlock Unitary Seals for use on rotary shafts of boiler feed pumps, chemical pumps, oil refinery pumps, digestor circulating pumps and other process pumps is contained in a new 12-page catalog. Cutaway drawings are given of various type seals together with lists identifying the parts shown and their functions. *Garlock Packing Co.*

For free copy circle No. 6 on postcard, p. 121

Industrial trucks

Factors for consideration when specifying an industrial truck are detailed in a new 4-page folder. Covered are such considerations as a truck's capacity, lift, total weight and size, battery capacity, mechanical features and location of truck controls. Also included is a convenient table listing 22 points that should be used for evaluating the type of truck most suited to a given operation or operations. *Elwell-Parker Electric Co.*

For free copy circle No. 7 on postcard, p. 121

Tracer-controlled miller

Details on an automatic unit built specifically for tracer-controlled milling are contained in a 4-page folder. The literature describes how the unit accurately reproduces the shape of any 2-dimensional template or a 3-dimensional full model. Features of the miller and complete specifications are also included. *Pratt & Whitney, Div. of Niles-Bement-Pond Co.*

For free copy circle No. 8 on postcard, p. 121

Plastics

A 12-page booklet summarizes technical data about the wide range of special and general-purpose Bakelite phenolic, vinyl, styrene, polyethylene, fluorothene, polyester, silicone and epoxy plastics and resins, and Krene film and sheeting. More than 50 plastics and resins are described under the headings: Molding Materials, Extrusion Materials, Laminating Plastics, Bonding Materials, Vinyl Calendering Materials, and Plastic Rigid Sheets. *Bakelite Co., a Division of Union Carbide and Carbon Corp.*

For free copy circle No. 9 on postcard, p. 121

FREE TECHNICAL LITERATURE

Double action presses

The complete capacity-range of a line of double-action straight side presses, with latest design features and improvements, is shown in a new illustrated catalog. The 28-page book shows actual production models, with stroking rates comparable to single action presses, which enable an entire press line to operate at peak performance levels. Presses included in the catalog range from 200-ton to 2000-ton capacity, and can be modified to meet individual manufacturers' requirements. Specifications given in easy-to-read chart form, include: capacity in tons, number of connections, bed size, effective draw, stroke, horsepower, shutheight, slide adjustment and bed opening. *Danly Machine Specialties, Inc.*

For free copy circle No. 10 on postcard, p. 121

Bucket maintenance

Practical help for clamshell bucket operators is presented in a new bulletin reported to be the most comprehensive work of its kind ever issued by any bucket manufacturer. It contains 40 pages of illustrations and carefully indexed information including: how to use counterweights for maximum efficiency; when to increase or decrease bucket reeving; what makes bucket lips bend in or bow out; cable life; welding procedures for building up worn cutting lips, repairing fractures, etc., in high carbon plate and cast alloy steel. Numerous other items include a list of common abuses leading to early bucket failure and proper lubrication practices. *Blaw-Knox Co.*

For free copy circle No. 11 on postcard, p. 121

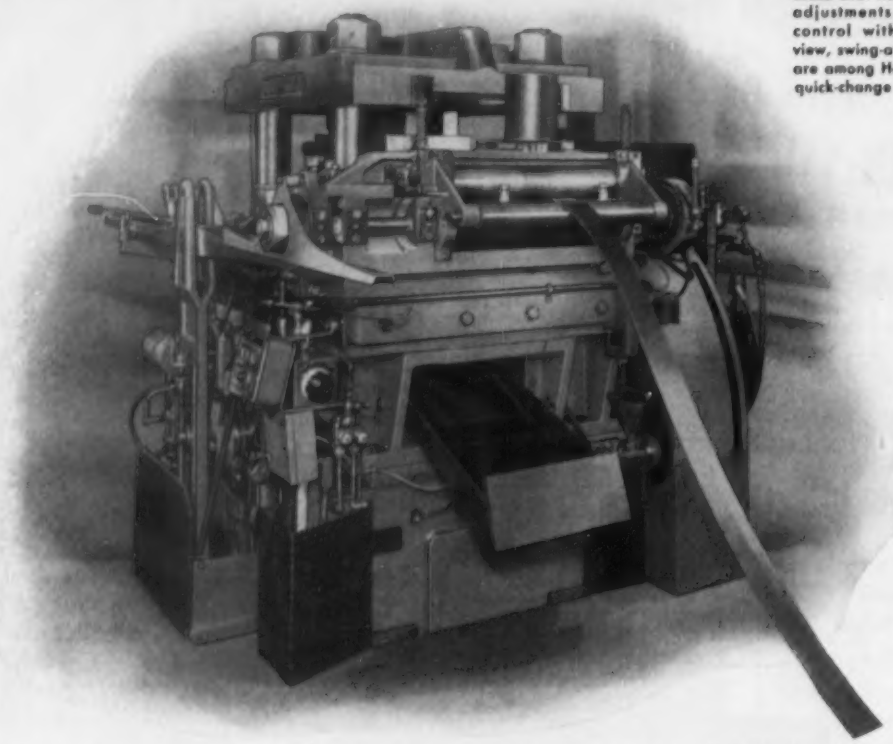
Grinding machines

A complete line of precision grinding and lapping machines is described in new general catalog. Photographs and specifications are given on cylindrical grinders, cam, shape and crankpin grinders, tool and cutter grinders, universal grinders, surface grinders, lapping machines, and special purpose grinders. *Norton Co.*

For free copy circle No. 12 on postcard, p. 121

Two to three die changes a day

HENRY & WRIGHTS COMBINE HIGH SPEED OPERATION WITH HIGH SPEED JOB CHANGE



Open construction, easy-to-make shut height and feed adjustments plus inching control with die in full view, swing-away roll feeds are among Henry & Wright quick-change features.

As many as two to three job changes in a day are being made by companies taking advantage of the quick-change features of Henry & Wrights. These companies report sharply reduced costs on short runs. A contract plant said it had greatly improved its competitive cost situation and was re-bidding on jobs previously lost.

Their unique quick-change features are just some of the reasons why Henry & Wrights rate preference in modernization programs. Other advantages are high speed with minimum vibration, precise alignment of punch and die, quick-stop pneumatic clutch, overall rigidity—and the assurance of longer die life.

Only the best is good enough

You owe it to yourself to get the complete story about Henry & Wrights and how they can improve your stamping methods. Our representative will be glad to give you the details.

HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

521 WINDSOR STREET, HARTFORD, CONNECTICUT

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 116

Aluminum plate, barstock

Comprehensive discussion of aluminum plate and barstock is contained in a new 12-page brochure. Sections are devoted to the construction features of the material, its production, applications and properties. Specifications are included as well as thickness, width and length of plate and barstock sizes. *Red Seal Metals Co.*

For free copy circle No. 13 on postcard

Flooring

A 24-page brochure describes structural flooring which provides electrical raceways serving every square foot of the floor surface. These floor sections, which are designed to provide ample space for electric wiring inside the beams, are produced in various forms with one, two or three beams in several metal gage combinations. The brochure discusses advantages of this construction material and gives section property and load tables. *R. C. Mahon Co.*

For free copy circle No. 14 on postcard

Dye penetrant inspection

An illustrated folder describes dye penetrant for inspection which comes in self-contained pressure can eliminating use of brushes, pumps, hose line or spray guns. The manufacturer states that this agent—called "Spotcheck"—enables user to find cracks, seams, porosity and other defects open to the surface in practically all nonporous materials. All the required equipment—penetrant, cleaner, developer—is packaged in pressure cans and assembled in a fiber glass case. *Magnaflux Corp.*

For free copy circle No. 15 on postcard

Stainless fastenings

A 64-page stock list covers over 9000 stainless steel and nylon fastenings with their sizes. Included are all types of screws, bolts, nuts, pins, lock pins, washers, nails, balls and aircraft fastenings in different stainless steel analyses. A-N specifications are indicated. Price lists and discount sheets are included in the manual. *Anti-Corrosive Metal Products Co.*

For free copy circle No. 16 on postcard

Traveling cranes

A line of overhead traveling cranes is described in an 8-page illustrated catalog. It contains photographs and explanations of major components such as hoist mechanisms, drive assemblies, trolleys and controls. Also contained in chart form are standard dimensions, clearances and capacities for all sizes of the cranes. *Whiting Corp.*

For free copy circle No. 17 on postcard

Rail steel

A reference book details with text and pictures the origin, production and application of rail steels. Application section discusses uses of rail steel in the construction industry, as well as dealing with ductility, bending, shockproofness tests and fatigue. *Rail Steel Bar Assn.*

For free copy circle No. 18 on postcard

Lathes

A new 8-page bulletin describes Model 280 16-speed lathes. The bulletin shows details of features and application set-ups, describes operation and specifications and lists standard and optional equipment. *Springfield Machine Tool Co.*

For free copy circle No. 19 on postcard

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **12/1/55**

Circle numbers for Free Technical Literature or Information on New Equipment:

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31	32	33	34	35	36	37	38	39	40
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If you want more details on products advertised in this issue fill in below:

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Temperature cabinets

Data on a complete line of temperature cabinets from 1 cu ft to 45 cu ft is contained in a new 4-page bulletin. Described are units available for use at standard temperature ranges from +300°F to −200°F through mechanical refrigeration, as well as lifetime sealed electrical units for use at higher temperatures. Standard and optional features of the cabinets are listed. *Webber Engineering Corp.*

For free copy circle No. 20 on postcard

Shuttle conveyor

Information is available in Bulletin 110 about a shuttle-type conveyor which operates on a single level without the necessity of a second level return. The booklet describes how the conveyor operates in a trough or trench with blades pushing the material along in successive steps. Trough and blade widths are in 2 in. progressive sizes from 6 in. to 30 in. Units can be made for portable or permanent stationary installations. *Industrial Filtration Co.*

For free copy circle No. 21 on postcard

Set screws

A 6-page brochure in color describes and illustrates the new Setko Jewel Case of set screw ideas. In the brochure is an explanation of each of the more than thirty samples of set screw products included in the Jewel Case itself. Some of these items are hopper-fed, self-tapping and pivot-lok set screws, other special varieties and allied products such as pipe plugs and hexagon keys or wrenches. *Set Screw & Mfg. Co.*

For free copy circle No. 23 on postcard

Creep testing

Literature is available which describes a line of creep testers. Included is model designation, type, salient features, floor space and capacity of the units in the line. Photographs show these various models, as well as the company's other products which include heat treat units, instrument cabinets and master control panels. *Arcweld Mfg. Co.*

For free copy circle No. 23 on postcard

Machine tool building

The designers and builders of special machine tools ranging from small, single-station units to large, multiple-station transfer-type machines have published a brochure describing the scope of their coordinated building service. The booklet illustrates and describes how engineering and manufacturing facilities have been expanded and coordinated for efficiency of operation. *W. F. & John Barnes Co.*

For free copy circle No. 24 on postcard

Company profile

Engineering, research, production of raw material, quality control and plant operations are described in a booklet prepared by a producer of automatic screw machines. Booklet is designed to acquaint the reader with the company's facilities. *Harvey Aluminum, Div. of Harvey Machine Co., Inc.*

For free copy circle No. 25 on postcard

Refractories

A 4-page leaflet describes and illustrates refractories for nonferrous melting furnaces. Twelve types of melting units are covered with product recommendations for each. They are: stationary crucible furnace, indirect arc furnace, induction furnace, rotary furnace, tilting crucible furnaces, stationary crucible furnaces (coke fired, air cooled), reverberatory furnace (aluminum melting, bung arch), holding furnace, metal pot furnace and cupola. Also discussed are ring linings, tile linings, ramming and patching cements and castable cements. *The Carborundum Co.*

For free copy circle No. 26 on postcard

Screener, separator

Specifications, drawings and descriptive data on a new, self-contained screening and separating unit are included in Bulletin 525. The unit has a magnetic pulley supplying power pull for removal of tramp ferrous material. There is discussion also in the bulletin of the unit's field adjustment control over rate of feed from the hopper and intensity of vibration. *National Engineering Co.*

For free copy circle No. 27 on postcard

METALS: Flexible Pilot Plant

Maximum versatility was the equipment philosophy behind Westinghouse's Blairsville metals plant . . . facility combines pilot, production operations.

A new Westinghouse Electric Corp. metallurgical plant near Pittsburgh provides a nearly complete range of equipment for processing both wrought and cast alloys. Designed to shorten the gap between laboratory development and commercial application of new alloys and processes, the $6 million facility provides equipment flexible enough, and sizable enough, for processing under actual manufacturing conditions.

At the same time, the commercial-sized equipment will turn out limited production of various alloys. These operations, Westinghouse explains, will permit reasonable loading of equipment that normally would not be fully loaded on development work alone.

Final development link

The plant is described as the final development link in the company's metallurgical research facilities. Within its 173,000 sq ft area are equipment for investment casting, shell molding, powder metallurgy, induction vacuum melting, induction air melting, plus forging hammers, presses, hot and cold rolling mills, and complete heat-treating facilities. Tiny, highly complex parts can be produced, or metal can be reduced from ingot size down to strip only 0.0005 in. thick.

Also included is equipment for slitting the strip, all necessary quality control and inspection facilities, and all kinds of materials handling and conditioning equipment, as well as other auxiliary items.

Emphasis on flexibility

Emphasis throughout, in equipping the plant, was on flexibility and multi-purpose usefulness. The induction vacuum melting furnace, for instance, will handle a range of work from 300 to 2000 lb, and can be adapted to vacuum-cast large ingots or for low temperature vacuum annealing of titanium. Slab-heating furnaces for the hot strip mill also supply billets to the four-high mill stands. Motor-generators powering the 2000 hp hot mill also power the 1100 hp cold mill.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Charge is poured from 3000-lb induction air melting furnace.

Most equipments are being operated at well under their capacity, or are capable of being modified for heavier work. This will allow for whatever demands future developments may make on the plant.

Philosophy behind it

The need for the plant became

apparent, Westinghouse says, when it became evident several years ago that further improvements in design of steam and gas turbines, generators, transformers, nuclear power reactors, etc., would depend in large part on improved materials. Development of improved metals and alloys having high temperature, strength and magnetic characteristics were necessary to overcome these "design stops."

At the same time, development or improvement of commercially practicable processes for translating improved materials into finished products was necessary. The Blairsville plant was the result.

Handling:

Grapple-magnet doubles scrap pickup capacity.

A combination grapple and magnet developed by M. P. McCaffrey, Inc., Los Angeles, is giving scrap metal operators two to three times as much pickup capacity as a grapple, magnet, or clamshell bucket alone would provide, using the same crane.

In addition to helping speed scrap handling operations, the device affords several specific advantages.

Handles All Scrap

Designed for handling baling material, small loose material, prepared scrap, or for clean-up, the unit relies on four keenly-pointed

Combined grapple-magnet permits speedier handling of scrap.

tines to achieve improved penetration into all types of scrap metals. These bite deeply into the scrap, hold it firmly while it is carried

overhead, and prevent the load from slipping.

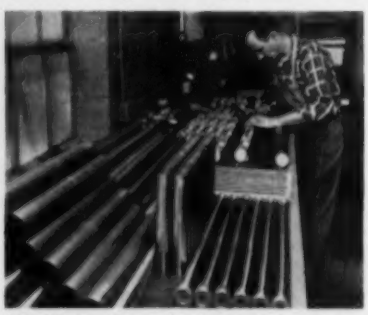
According to the manufacturer, the new Grapple-Magnet is greatly minimizing the handling of excess dirt. Scrap yards use it as a magnet or as a grapple, or both at the same time.

The unit is fitted into an eight-foot truck body. Grapples weigh approximately 2300 lb; the magnet, 1100 lb.

Instruments:

Stainless sheath protects radioactive loggers.

Thin-wall stainless steel tube is employed to protect radioactive logging instruments in a new application. The tube has a flawless, smooth surface which keeps radiant energy and stray electrical



Well-logging instruments are checked, then inserted in protective tubes.

interferences out. A close fit is required to avoid entrance of dust, gas and other contaminents.

Radioactive logging instruments are delicate mechanisms used in taking gamma ray and neutron measurements in oil wells. The prima donnas of the instrument field, they are sensitive to stray electrical interferences, radiant heat energy and to varying radioactivity within the well.

Use of the stainless tubing has solved a troublesome short-circuiting problem which arose when plated steel was used for the sheath by the instrument manufacturer, Well Surveys, Tulsa, Okla. The plating tended to flake off and cause short circuits in the sensitive instruments.

To replace the plated material, Well Surveys needed tubing that

would resist the corrosive effects of oils and gases, have thin wall to hold down size, be free of flaws and have a smooth surface, and have close tolerances to permit snug fit of the instruments inside the case and of the entire assembly in the outer housing. Type 304 stainless tubing was satisfactory as supplied by Superior Tube Company, Norristown, Pa.

The tubing is 2.098-in OD with a 0.018-in. wall. The as-drawn condition provides a smooth surface with a suitably high shielding factor against stray electrical waves. The instrument maker polishes and buffs the tubing outer surface for additional radiant shielding.

Methods:

Modified pliers save time, effort.

Tiny sponge rubber wire-holders called boggles, which secure the miles of electrical wires in the bomb bay section of Convair's B-36, are enclosed by metal clamps. Company electricians at Convair open and close these clamps many times each day in working on electrical harnesses.

Tiring of squeezing the boggles by hand, a company employe ground down pliers so that the plier nose would fit into two rivet holes on the boggle clamp.

Instant Success

The pliers proved an instant success on the job, saving lots of time as well as fingers.

More than a hundred pairs of the specially designed boggle pliers are now on order for other Convair electricians.

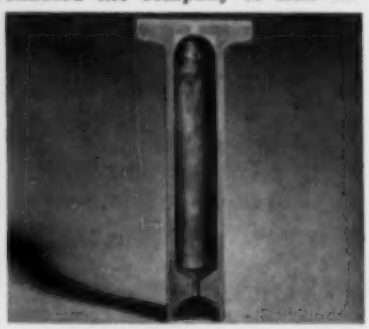
Ground-down pliers now crimp boggles formerly squeezed by hand.

Brazing:

Improved technique extends valve lifter life.

Development of a brazing technique recently, in joining cemented carbide to its valve lifters, culminated in an engine component that enabled Mack Trucks Inc., Plainfield, N. J., to not only increase power output of bus and truck engines, but also extend lifter life by thousands of miles.

Perfecting of the joining method enabled the company to take advantage of the properties of carbide, thereby increasing performance of its valve lifters from 17,000 to as much as 300,000 miles without appreciable wear. The carbide-faced lifters also allowed the use of engines with greater cam loads, resulting in greater outputs from the power plants.



Cross-section of Mack's valve-lifter, faced with carbide disk.

Problem of Wear

Use of carbides for valve lifters in Mack's engines started when the company began to increase power output of its engines. Increasing the sharpness of engine nose cams and valve spring loads brought about considerable wear and galling on the lifter face. This presented the company with a serious problem since bus and truck engines, unlike pleasure cars, must be kept running for long periods of time.

Chilled cast iron lifters sometimes proved to be erratic in performance. Thus failure of one or two lifters of this type was quite common. Buses especially provided considerable valve trouble because


TOPS
in cold finished carbon steel bars
"J&L 1200"
Use "J&L 1200" steel
on your tough jobs for . . .
tops in quality
tops in machinability
tops in uniformity
tops in finish
available in all standard
shapes and sizes
"J & L 1200" Steel provides the qualities that help machine operators do top-flight work at lower overall costs. With "J&L 1200," the operator obtains: better machine finishes . . . longer tool life . . . higher rates of speed. This fact has been proven time and again—in shop after shop.
"J&L 1200" grades meet the compositions published by the A.I.S.I. . . . S.A.E. . . . and Federal Specifications QQS-633.
Try this steel in your own shop. Results will convince you "J&L 1200" deserves to be a regular specification for your production runs.
J&L STEEL
Jones & Laughlin
STEEL CORPORATION — Pittsburgh

of constant acceleration. They average something like 15 stops to the mile.

By enlisting the help of Carboloy metallurgical engineers, a carbide disk was developed which met the requirements of the company's range of engines. Initial tests of the carbide, grade 779, boosted mileage of the lifters to as much as 150,000 miles. The problem of joining these disks, however, was not satisfactorily licked until recently.

Mack now uses the carbide-faced lifters in its diesel, gasoline and supercharged diesel engines. Use of carbide, the company finds, not only reduces wear drastically, but also improves performance of the lifters by burnishing the cam surfaces.

Fabrication:

Powder compacts solve production problem.

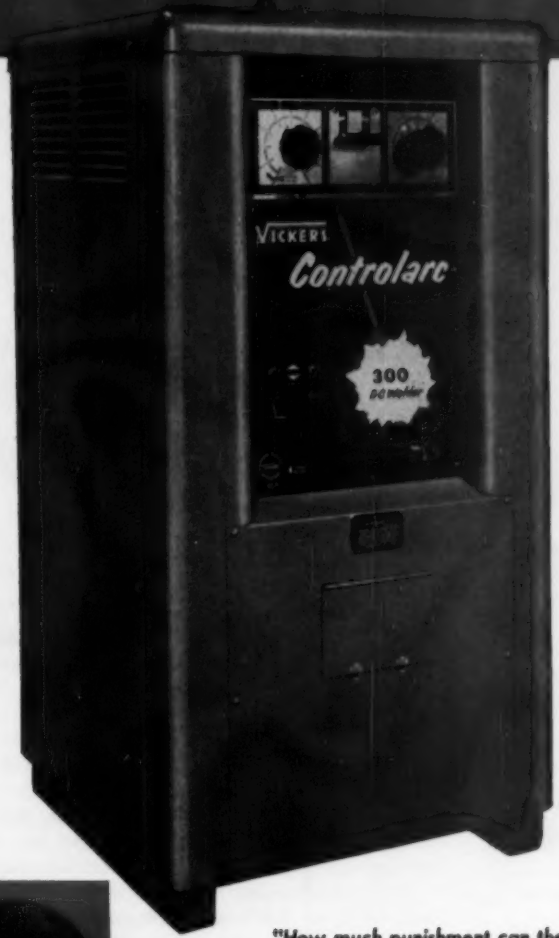
Development engineers at General Electric's Meter and Instrument Department, West Lynn, Mass., have solved some of their production problems economically by compacting electric-instrument magnetic pole pieces of electrolytic iron powder. This is a product of Plastic Metals Div., The National Radiator Co., Johnstown, Pa.

To have the best magnetic properties, pole pieces must be made of soft pure iron. In addition, most electric - instrument pole pieces have odd shapes which require difficult and costly machining operations to produce them from low carbon, pure iron plate or bar stock. The soft iron, being extremely tough and ductile, tears and drags when it is shaped by the cutting tools. Not only is labor cost high, but tool replacement expense can be a major factor.

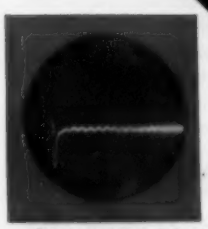
Simpler Fabrication

In contrast with these machining headaches, it is relatively simple to fabricate pole pieces from iron powder. This can be compacted to unusually high density which, after the conventional

VICKERS® Controlarc DC Arc Welder Survives Punishing "Durability Test"



OVER 1,000,000 CYCLE HIGH-SPEED REPETITIVE ARC TACK TEST EQUIVALENT TO MORE THAN TWO YEARS OF CONTINUOUS USE



This unretouched oscilloscope photograph shows the voltage trace occurring when the arc was broken very quickly during the test, subjecting the CONTROLARC welder to severe abuse.

"How much punishment can the Vickers CONTROLARC DC Welder take?"

Vickers engineers decided to find out.

A 200-ampere CONTROLARC was subjected to a gruelling durability test. Every nine seconds the welder was charged with a six-second load of 250 amperes (50 amperes above rated capacity) at 27.5 volts. After 198,900 "makes" and "breaks" the load was boosted to 300 amperes at 27 volts. When the test was concluded the CONTROLARC had survived 1,004,522 of these charges, *and was still going strong*—with no apparent effect on any part of the welder. This test simulated arc tacking on production at 4 tacks continuously per minute on an 8-hour day basis for over two 300-day years.

For complete information about this rugged, dependable welder, write today for new bulletin.

VICKERS ELECTRIC DIVISION

VICKERS Inc. a unit of Sperry Rand Corporation

1857 LOCUST STREET • SAINT LOUIS 3, MISSOURI

sintering operation, provides the desired high permeability. With no machining, therefore, GE is making excellent pole pieces from iron powder. No problem is presented if drilling or tapping is required.

Each Part Studied

This is not a blanket rule. The company says each part is studied carefully before production is started and powder metallurgy must, in every case, justify its use. The decision frequently hinges on how much machining is involved.

These miniature magnet pole pieces are made of electrolytic iron powder.

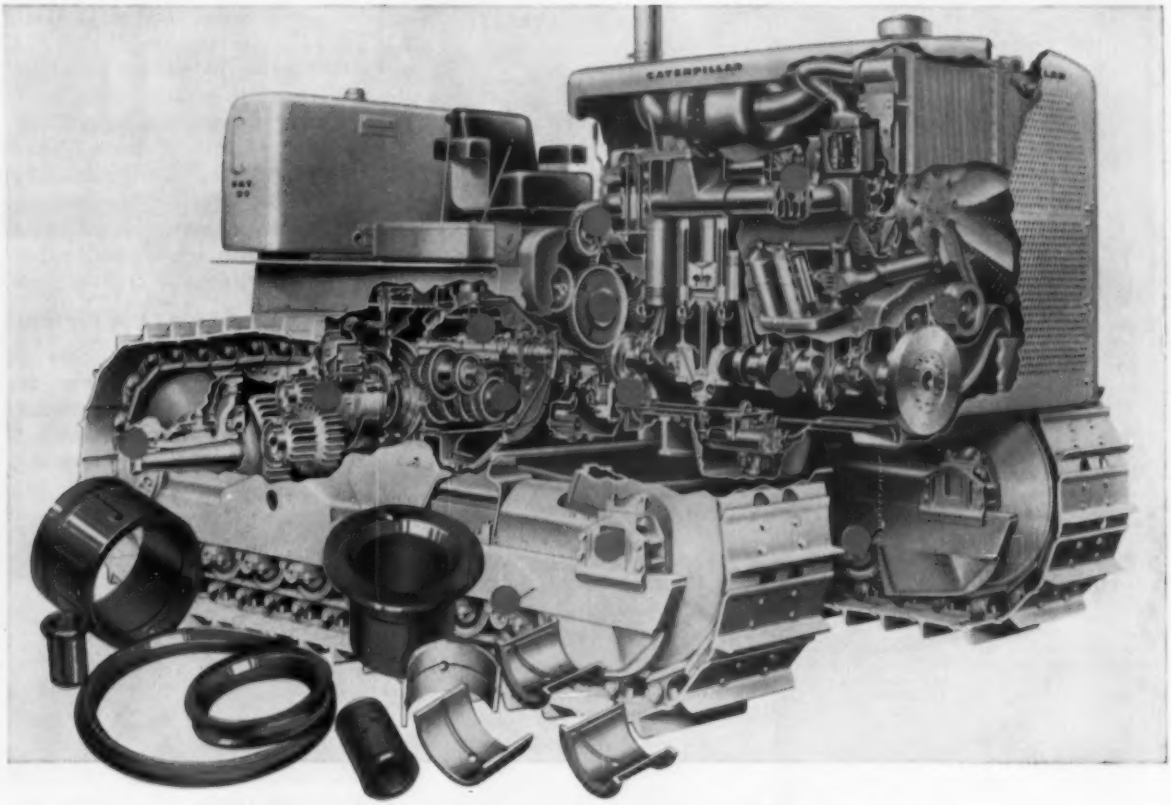
Examples of electrolytic iron powder parts made in GE shops include curved pole pieces for miniature panelboard meters. These are compacted of electrolytic iron powder, sintered, then soldered to Alnico magnets. Small watthour meter adjusting shunts, another example, are compacted, sintered and then tapped to match threaded mating screws.

Maintenance:

Battery charging shop centralizes operation.

Several ideas of value to other large users of battery-powered industrial trucks were incorporated into the recently-relocated battery charging and truck maintenance shop at Reynolds Metals Co.'s Aluminum Sheet and Plate Works, McCook, Ill.

Gould-National Batteries, Inc.,



Dependable Johnson Bearings

Help Give Long Life To Big Cat Machinery

Engine bearings and bearings in track rollers and other components play a big role in the ability of Caterpillar Diesel Tractors to give long, satisfactory performance on tough jobs.

Caterpillar Tractor Co., manufacturers of the big yellow, earth moving rigs you see at every hand, makes certain that each part has the quality and stamina to give trouble-free service.

The ability of Cat equipment to handle difficult assignments depends in part on bearings obtained from Johnson Bronze Company of New Castle, Pa., which supplies a wide variety of the bearings used throughout Caterpillar products.

Dependable Johnson bearings—made of aluminum on steel, babbitt on steel, cast bronze, bronze on steel, and sintered bronze powder (Ledaloyl)—help Caterpillar meet its triple objective of: 1. durability, 2. bigger pay loads, and 3. longer life. Johnson also offers Caterpillar sound engineering help, has a complete line, maintains uniform high quality and consistently meets Caterpillar's specifications.

This is a typical example of the service Johnson gives many manufacturers in all industry by supplying them with many types of bearings for a wide variety of applications—from automobiles to sound recorders—from automatic washers to machine tools—to name but a few.

To enjoy the dependability and economy of Johnson bearings in your products, write for information on how Johnson engineers will work with you to make a better product at lower cost. Johnson Bronze Company, 505 S. Mill Street, New Castle, Pennsylvania.

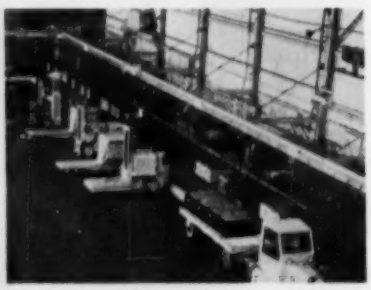
Johnson Bearings

LEDALOYL (powder metallurgy) • ALUMINUM ON STEEL • BRONZE ON STEEL • STEEL AND BABBITT • CAST BRONZE

reports that 65 electric industrial trucks at this plant, ranging in capacity from 4000 lb to 20,000 lb, operate over 57 acres. These are powered by 150 batteries. A central battery charging shop and truck maintenance depot was decided upon to achieve well-supervised charging and battery care.

Five Trips Per Shift

To reduce traveling time of trucks operating in areas far from the battery shop, a tractor-trailer carries six charged batteries to the distant cast house, returning with discharged batteries on a schedule of five round-trips in an eight-hour shift.



Batteries from 65 trucks are handled in this charging station.

Many of the electric trucks return to the battery-room to exchange batteries periodically. Trucks backing into place are prevented from accidentally colliding with the charging racks by a 60° slope concrete curb placed in front of the racks.

Crane Moves Batteries

An overhead crane reaching all parts of the battery shop and truck repair depot moves all batteries. A clip-board is attached to the control pendant of the crane so the attendant can make entries on the record sheet as soon as the move has been made.

Several sizes of batteries are handled but only one spreader bar is required. The hooks of the spreader bar can be moved in or out to adjust to the size of the battery being lifted.

Charging Load Equalized

Five diverterpole motor generators of 75 KW capacity each are arranged to equalize the load on

LOEWY

High Speed

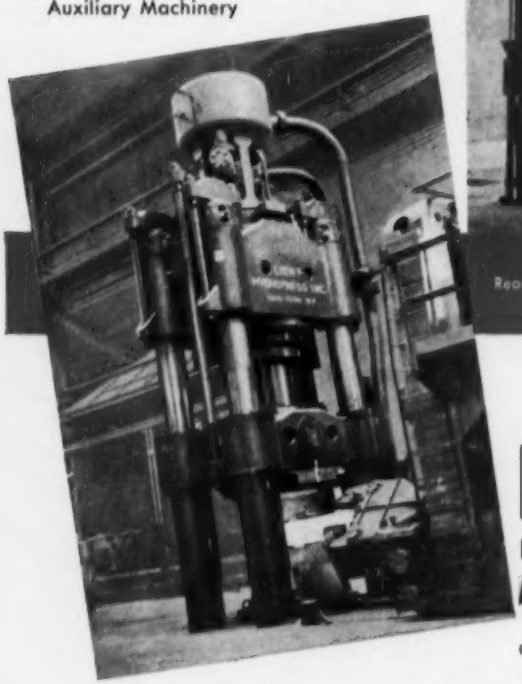
FORGING PRESSES

are replacing hammers to forge blooms in specialty alloy steels
WITH FEWER REHEATS

Loewy Hydraulic Presses for the steel and non-ferrous industries

- Forging and Die Forging Plants
- Deep Drawing Single and Double Acting Presses
- Extrusion Plants for Steel and Non-Ferrous Metals
- Hot and Cold Rolling Mills and Auxiliary Machinery

High-speed forging press of 2,000 ton capacity



Rear view with manipulator.

LOEWY-HYDROPRESS NEW YORK

LOEWY HYDROPRESS

HYDRAULIC DIVISION • ROLLING MILL DIVISION

BALDWIN-LIMA-HAMILTON

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two separate charge panels, two generators on the west panel and three on the east panel. Each charge circuit is regulated by a temperature compensated voltage relay in series with an MP-2 timer and resistance elements providing correct voltage for the particular battery to be charged.

The arrangement of charge circuits is flexible and can be modified by changing resistance taps on the rear and fuses on the face side of the charge panel.

Materials:

Molded plastic caps protect grease fittings.

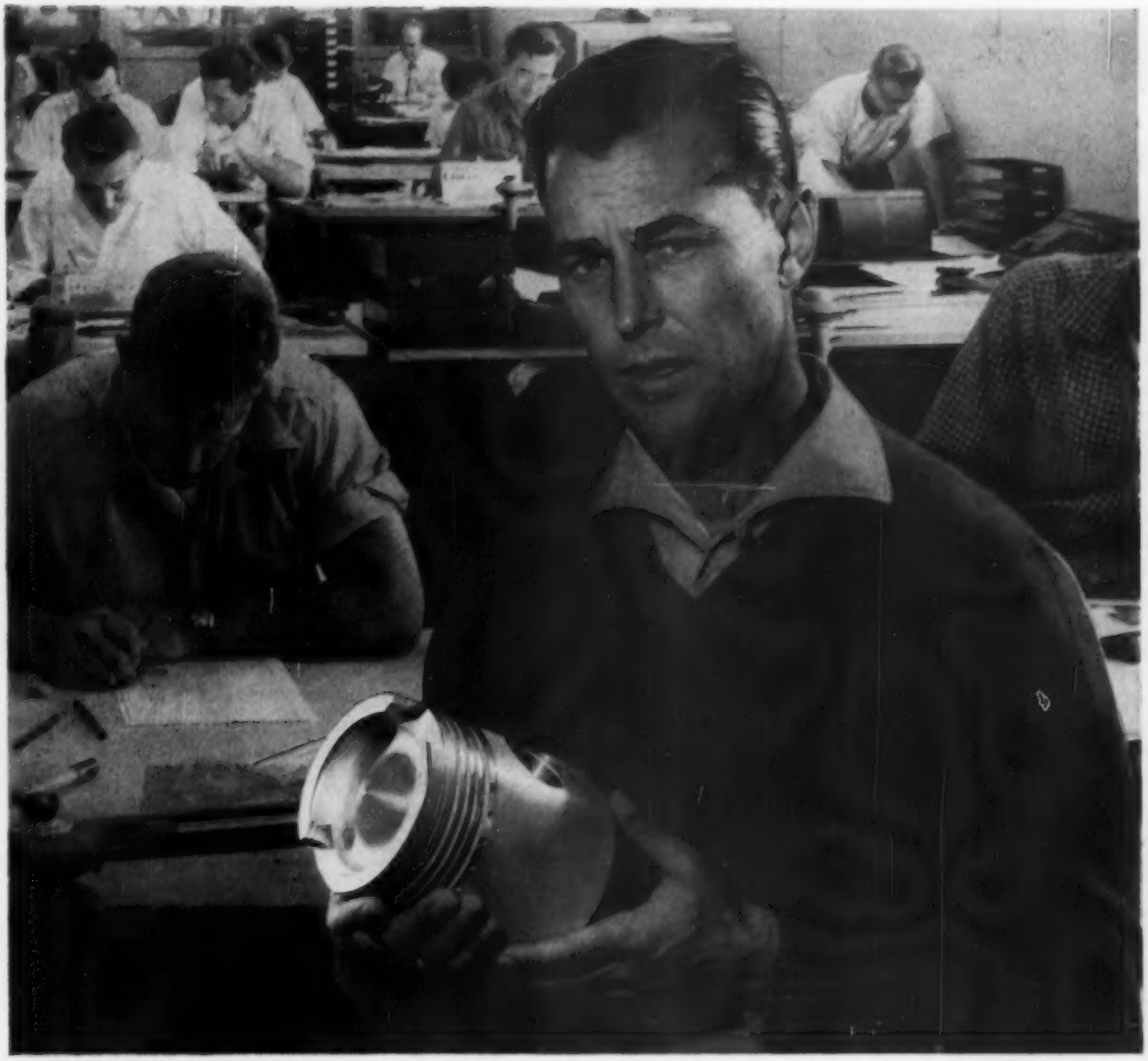
Molded caps no bigger than a thumb-tip are helping prolong the life of bearings and bushings by keeping dirt, grit and water out of high-pressure grease fittings. The tight-fitting caps, molded of Bakelite polyethylene, also protect fittings from nicks or burrs.

Various branches of the Navy and Marine Corps have tested the caps in the laboratory and on naval gun mounts, combat vehicles, dump trucks and amphibian tractors. Checks made over a temperature range of —40 to +200°F., on wet or dry dirt roads, through water and off-the-road conditions showed that the caps held tight to seal out foreign matter from openings in vital grease fittings. Dirt and grit that gather around unprotected fittings are often forced into bearings and bushings by the grease gun.

Simplify Identification

Lubricating procedures and maintenance control are also reported improved by the use of caps molded in different colors for easy identification. Greases, lubricating oils, paints, transmission fluids and water have so little effect on the polyethylene that caps made of it can be re-used indefinitely.

In painting, sandblasting, assembling or storing of equipment the handy caps also provide protection for grease fittings.



"We always had them cast; but we found Harvey Aluminum forgings made better pistons"

Four important things happened when this manufacturer switched from cast aluminum to Harvey Press Forgings. First . . . machining operations were sharply reduced. Second . . . the dense, fine grain structure cut rejects. Third . . . scrap loss dropped. Fourth . . . the product was improved, for high-strength, press-forged pistons assured longer engine life. The whole story, summed up, is one of lower manufacturing costs, better product, higher profits. Harvey Press Forgings can help your own product the same way. A Harvey Engineer will be glad to show you how. The first step is to send *today* for our latest brochure, "Aluminum Forgings."

Harvey is a leading independent producer of aluminum extrusions in all alloys and all sizes, special extrusions, press forgings, hollow sections, structurals, rod and bar, forging stock, pipe, tube, impact extrusions, aluminum screw machine products and related products. Also similar products in alloy steel and titanium on application.

Making the most of aluminum . . . for everyone

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC.
TORRANCE, CALIFORNIA
Branches in principal cities

DIE-CASTING: Zinc Substitutes for Aluminum

Redesigning a 3.5 in. rocket fuse for zinc die castings in place of aluminum cut costs substantially, speeded production . . . Weight, ballistics characteristics remain unchanged.

A new rocket fuse design substitutes zinc die castings for aluminum stock previously used, thereby reducing costs by more than 50 pct and speeding up production. The M405 Inert Fuze, a product of the Monarch Governor Co., of Willow Run, Mich., is used by the Ordnance Corps for its 3.5 in. practice rockets.

The redesigned fuse has the same weight as the aluminum product it replaces and has been so constructed that the center of gravity has been changed only 0.045 in. from the original screw machine produced body. This means the ballistic characteristics of the round are unchanged.

Since specific gravity of zinc is 2.4 times that of aluminum, the zinc die cast body had to be designed so that enough volume should be eliminated without sacrificing necessary strength.

The new zinc die cast design eliminated several operations. Cutting off of bar stock is no longer required, and three holes which previously had to be drilled and threaded are now cored, while specification of expansion plugs in place of machine screws previously used eliminates the threading operations. Also, anodizing treatment is no longer needed, and zinc die castings require only an economical dichromate dip.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Fifty Pct Faster

The castings are produced from a four cavity die on a No. 2 Read-Prentice casting machine. Machining operations required are: trimming the flash and cutting the two threads. A special machine has been designed to chase the male thread and tap the female.

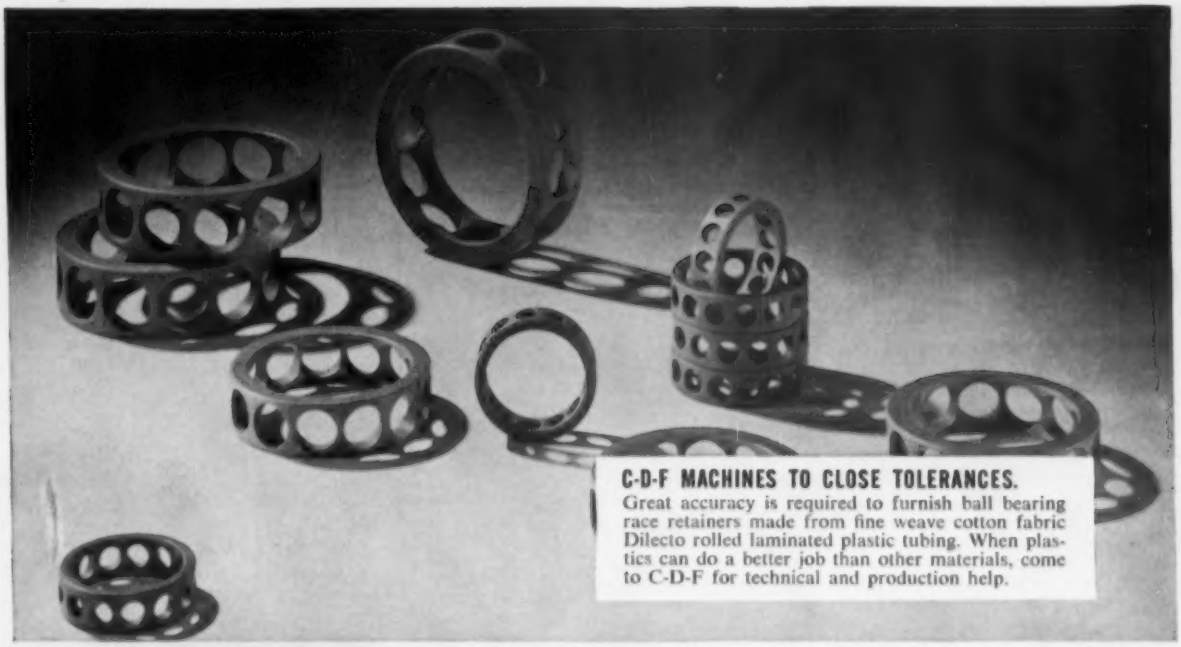
Production rates on this new design are currently 50 pct faster.

Redesigned zinc fuse is shown at left, aluminum fuse at right.

Packaging:

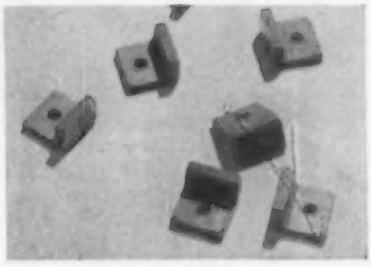
Fluorothene resin film protects from corrosion.

A new type of film only 0.004-in. thick protects delicate instruments from extremely corrosive



C-D-F MACHINES TO CLOSE TOLERANCES. Great accuracy is required to furnish ball bearing race retainers made from fine weave cotton fabric Dilecto rolled laminated plastic tubing. When plastics can do a better job than other materials, come to C-D-F for technical and production help.

C-D-F PIONEERED IN POST-FORMING of laminated plastics. This technique gives you stronger, more versatile insulating parts with lower costs. This aircraft channel strip is an example of simple post-forming.

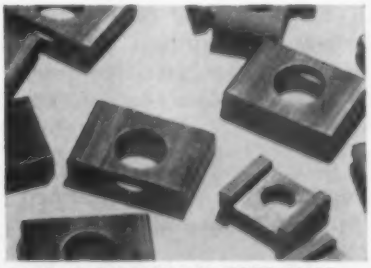


C-D-F DOES THE UNUSUAL. These rubbing blocks are made from fine-weave cotton cloth Dilecto molded *tubing* that has been pierced and cut. The part gains in mechanical strength — the product gets longer service life.

C-D-F SPECIALIZES IN AUTOMATIC SCREW MACHINING of plastic components. These breaker arm bushings are made from Dilecto paper base rolled tubing on high speed machines by men who know and use cost saving methods.

Yes, C-D-F is a big reliable source for fabricated plastics!

C-D-F SERVES MANY INDUSTRIES with fabricated specialties. A great amount is concentrated in the automotive and allied fields. This aircraft part has a corrugated surface on a strong woven asbestos laminated base.



C-D-F IS A PUNCHING SPECIALIST on these starter solenoid insulators. This is XX-26 Dilecto molded channel strip, pierced and punched to length. Special C-D-F punching grades give you lower costs, faster assembly, fewer rejects.

C-D-F COMES UP WITH THE ANSWERS to insulating problems. These unique snap-in grommets are easy to insert, spring out and hold tight. Write for samples. The chances are that C-D-F is already making the answer to your problem.

See our general catalog in Sweet's Design File for more technical data, the address and telephone number of your nearest C-D-F sales engineer. Also, write for detailed information, samples, or send us your print for quotation.

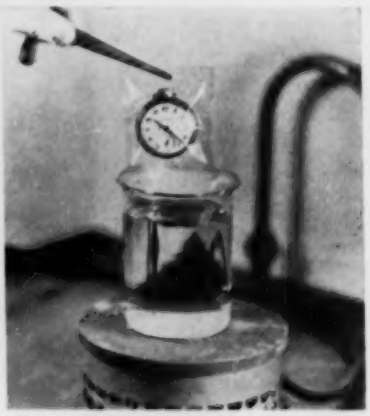
C-D-F *Continental-Diamond Fibre*

CONTINENTAL-DIAMOND FIBRE DIVISION OF THE BUDD COMPANY, INC.

NEWARK 85, DELAWARE

atmospheric conditions. Properly oriented, the Bakelite fluorothene resin film has a tensile strength of about 25,000 psi.

W. S. Shamban & Co., Culver City, Calif., produces the chemically inert film for applications in chemical, electronics, packaging and other industries demanding an unusual combination of physical, chemical, and electrical properties. Tough and flexible,



Film-protected watch gets 5-minute test dip into nitric acid at 230°F.

the film withstands highly corrosive chemicals such as fuming nitric acid and hydrazine, used as rocket fuels.

Meets Acid Test

To demonstrate this extreme chemical resistance an ordinary pocket watch with moving parts sensitive to corrosion was sealed in a film package made of Bakelite fluorothene resins and completely immersed in fuming nitric acid held at 230°F. A ten-penny nail dropped in at the same time completely dissolved in less than a minute. After five minutes in the highly corrosive bath the watch was reported unaffected and still running.

High dielectric strength of the film over a wide range of temperature and humidity conditions offers a positive and heat-resistant insulation for resistors, condensers, transformers and other electrical components. Resistance to moisture, fungus growth and hydraulic shock makes the film useful for packaging.


B-RIGHT-ON®
SOCKET SCREW PRODUCTS
always measure up!
QUALITY
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PRODUCTS
Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.
Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.
Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.
Write for descriptive literature . . . see how
YOU CAN DO BETTER WITH B-RIGHT-ON.
THE BRIGHTON SCREW & MANUFACTURING CO.
1829 READING ROAD CINCINNATI 2, OHIO

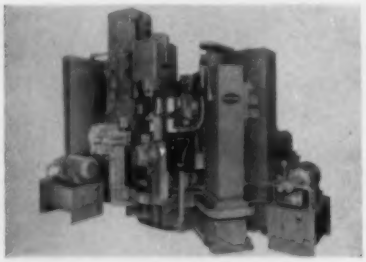
NEW EQUIPMENT

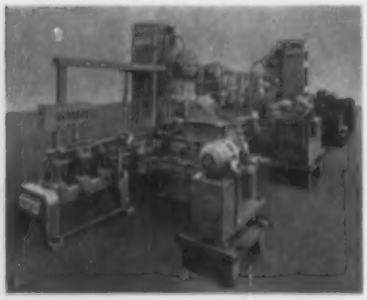
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 121 or 122

Drilling machine has built-in testing unit

Dial-type horizontal and vertical drilling machine incorporates a built-in hydraulic testing unit. The machine was developed and built to drill, spot face, chamfer, finish ream, tap and test brake pedals. Mounted on a welded steel base, it has a 42-in. automatic index table with a 6-station work-holding fixture. Before brake pedal is released at sixth station a special ram test is used. In case of failure of the part, machine shuts off automatically preventing rejects or fractured brake pedals from moving past to the assembly line. *Michigan Drill Head Co.*

For more data circle No. 28 on postcard, p. 121





Segmented transfer machine for exhaust manifolds

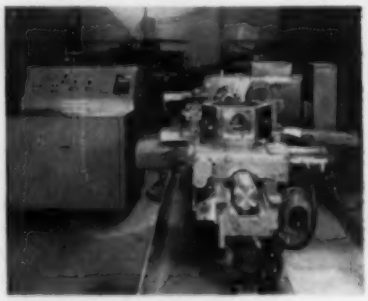
A 20-station, 43-ft long segmented transfer machine features a twisted slide rail arrangement that moves and orients automotive engine exhaust manifolds without the use of pallets. The unit performs all machining operations on the cast-iron manifolds except the mounting faces, which are ground before the parts are loaded into the machine. Two bushings and two pins of different sizes are also hopper-fed and assembled into the manifold by the machine which is stated to produce 106 manifolds per hr. One master control panel is provided for starting and stopping all segments from one point. *Snyder Tool & Engineering Co.*

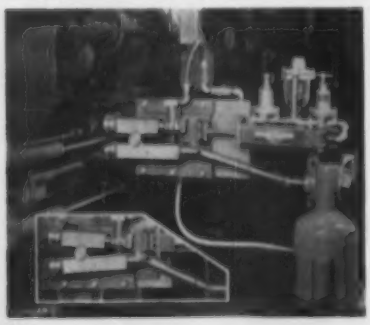
For more data circle No. 29 on postcard, p. 121

Punched tape control system for automation

A compact punched tape control system with suggested application in the automatic operation of machine tools has been announced. Called Binotrol, the device has a control console the size of an office desk. When operating, a coded signal, punched on tape, is fed into the machine and machine moves to a pre-determined spatial position. Instruction signals are punched on plastic tape with each signal translated into a binary code number. With this unit a machine tool starts, stops and re-cycles automatically without operator touching controls. *Barnes Engineering Co.*

For more data circle No. 30 on postcard, p. 121

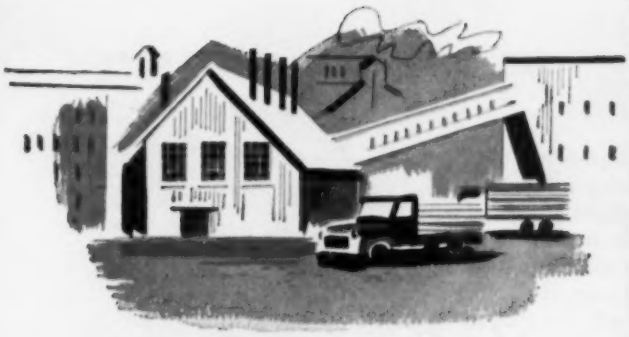




Stock feeder for mutiple spindle screw machines

Reloading a multiple spindle screw machine without stopping each time the feed stock is used up is the job of a new stock feeder. It includes a pair of rollers adapted to engage the stock between them to feed it to a spindle aligned with the rollers. The rollers are disengaged from the stock before machine indexes so this operation is not interfered with. After indexing, the rollers are moved into engagement with the stock in the next spindle which has, in turn, become aligned with the rollers. Photograph shows stock feeder engaged, while insert shows disengagement during indexing operation. Feeder is easily mounted for use. *Roll-O-Matic Industries.*

For more data circle No. 31 on postcard, p. 121



WEIRTON

GALVANIZED SHEETS

for long-lived roofing and siding

There's an easy way to solve roofing and siding problems quickly, dependably, economically. That's the Weirton way—with Weirton galvanized steel sheets. Their tight zinc coating resists cracking, peeling and flaking. The strength of steel plus the corrosion resistance of zinc gives added years of life. And long experience shows that galvanized sheets give more protection, with less maintenance and at lower cost.

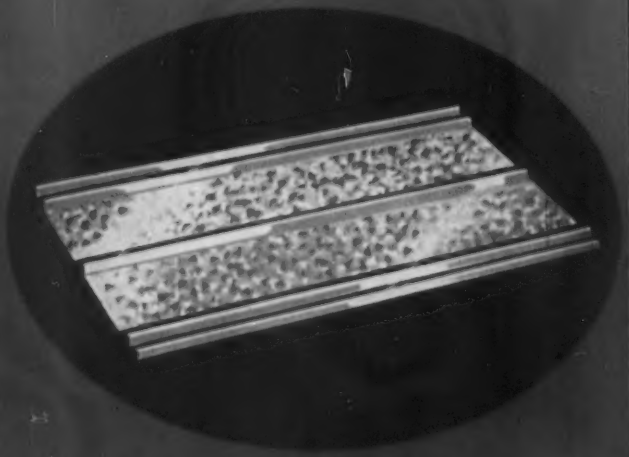
Weirton's modern production processes, plus close quality control all along the line, make Weirton galvanized sheets a best buy for your roofing and siding needs.

WEIRTON STEEL COMPANY

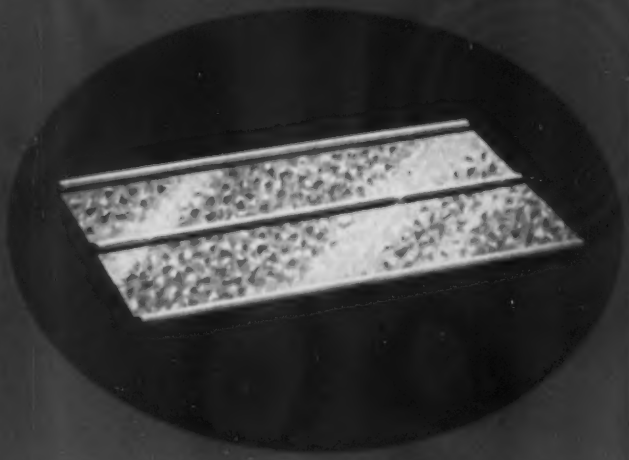
WEIRTON STEEL COMPANY

Weirton, West Virginia

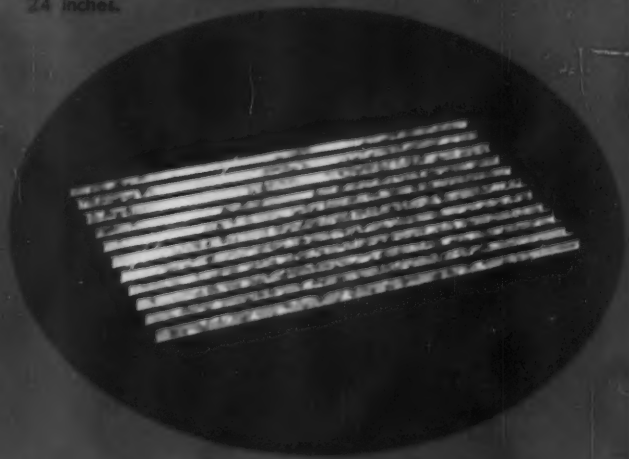
NATIONAL STEEL CORPORATION



Famous Weirton "Safety Drain" galvanized steel sheets combine maximum protection with outstanding good looks.



Weirton galvanized V-Crimp sheets are made in 2V-, 3V-, and 5V-crimped, and in gauges 26, 28 and 29, covering width, 24 inches.

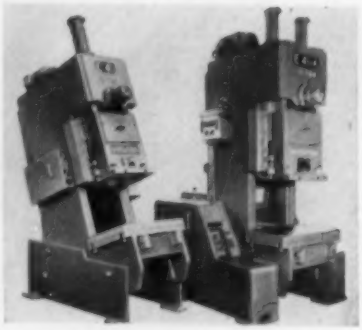


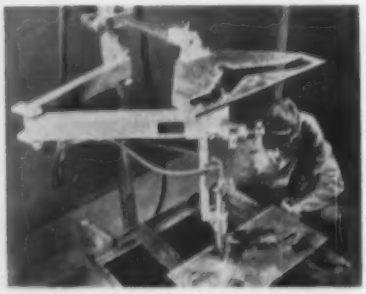
Weirton galvanized corrugated steel sheets are most economical in first cost, and are the strongest form of steel roofing because the corrugations strengthen the entire sheet.

New press design resists off-center loading

New Series E, single-point, open-back inclinable press features a front-to-back crankshaft design. The front-to-back crankshaft, with large crank pins, does not require a narrow frame for support and permits the distance between the gibs to be increased. Therefore, a wider box type slide, fully contained within the gibbing, gives full support to wide dies and resists off-center loading. The entire driving mechanism is fully enclosed within the press frame. An electro-pneumatic friction clutch operates directly on the crankshaft. The presses are available in standard and automation models. *Niagara Machine & Tool Works.*

For more data circle No. 32 on postcard, p. 121





Flame-cutting machine has magnetic roller

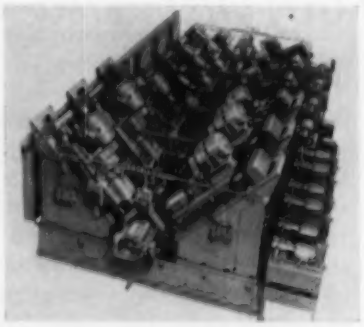
A flame-cutting machine featuring a permanent magnetic roller is built to cut any shape up to a full 42 in. circle and cut straight lines to 92 in. Recommended for shops where repetitive, accurate shape cutting with a single torch is required, this machine can also be used for larger cutting operations. The permanently magnetized tracing roller accurately follows a metal template of the most intricate shape. The unit is portable and will shape-cut any practicable thickness. Its motor drive shaft is equipped with a simple worm-gear drive. *Air Reduction Sales Co.*

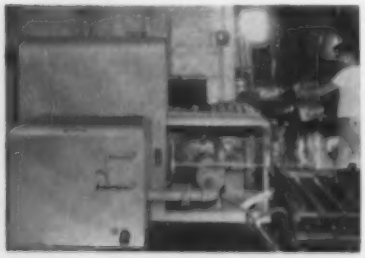
For more data circle No. 33 on postcard, p. 121

Precision boring machine for V-8 engine blocks

Representative of the machine tools being introduced in automation lines by auto manufacturers is a precision cylinder boring machine. It provides for six different machining operations on a V-eight engine block. In sequence the operations are: semifinish bore cylinders, chamfer cylinder tops, chamfer cylinder bottoms, semifinish bore four tappet holes, and finish bore four tappet holes. Locating dowels position the block, which is held firmly in place against locator buttons by hydraulic yoke clamps. A pattern of alternate boring is followed to allow for large diameter, heavy-duty spindles in boring the close-center holes. *Ex-Cell-O Corp.*

For more data circle No. 34 on postcard, p. 121





Spray washer for heat-treating operations

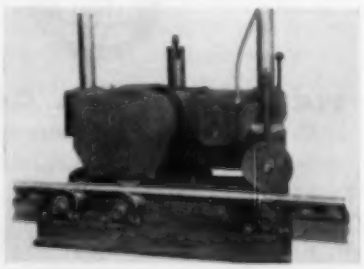
Designed especially for heat-treating departments, a packaged spray-type washing machine is manufactured in standard sizes to fit 24 in. x 36 in. x 15 in. carbo-nitriding furnace trays. It is available also in 24 in. x 48 in. x 18 in. sizes. The gas-fired model is heated by immersion tube with eductor. Spray nozzles above and below the work are supplied by a 240-gpm pump driven by a 2-hp motor. Storage capacity of the washer is 500 gal. Supplied either electrically or steam heated. *Waukee Engineering Co.*

For more data circle No. 35 on postcard, p. 121

Offset bar and tube printer offers fast setup

An offset bar and tube printer provides simple adjustments and interchangeable components for various sizes, colors and markings. Code numbers, trademarks, and specifications are printed at speeds up to 200 fpm either by variable speed drive or by friction driving from the conveyed material. The printer, automatically imprinting by friction contact, accommodates sizes from ½ in. to 14 in. OD with only one set of guide rolls. It marks all types of rigid or semi-rigid materials. *The Pannier Corp.*

For more data circle No. 36 on postcard, p. 121



You can order 52100 tubing right now...

we'll ship tomorrow

WHEN you need 52100 steel tubing in a hurry, get us on the phone. We'll ship the next day. We stock 101 different sizes of Timken® 52100 steel tubing —from 1″ to 10½″ O.D. All of them are available for less-than-mill-quantity orders.

Timken 52100 steel can be used for most hollow parts jobs and many manufacturers have substituted it for more expensive steels. A high-carbon chrome steel, it's through-hardening in moderate sections. It can be heat-treated to file hardness and tempered back to any desired point.

Here are some of the jobs 52100 is now being used for: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instrument parts.

The Timken Company is America's pioneer producer of 52100 tubing. We have an unequalled backlog of experience and as a result we can give you uniform quality from tube to tube—order to order. Every step of production is rigidly checked.

For immediate delivery of your less-than-mill-quantity orders, write or phone The Timken Roller Bearing Company, Steel & Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

NEW EQUIPMENT

Coolant chillers

Horizontal and vertical cabinet units are included in a line of coolant chillers supplied in sizes ranging upward from 5 gpm. The units are made of welded steel frames and heavy sheet metal cabinets. They are furnished with drier, expansion valve, combination pressure control, temperature control and water valve on water-cooled models.

The Model X horizontal unit is made in sizes ranging from 2 hp through 7½ hp. They measure 46 in. long, 26 in. wide and 30 in. high. The Model H-T vertical unit with a 7½ hp semi-hermetic unit is 26 in. sq, 50 in. high and will handle 30 gpm with a 6° temperature difference. *Industrial Filtration Co.*

For more data circle No. 37 on postcard, p. 121

Aluminum cover

Extruded aluminum way cover is designed to provide protection against chips, grit or other material damaging machine ways or way mechanisms. Its rigid construction permits operators to walk

on covers while machine is operating or idle. The cover is custom-made to fit any width or length machine and will not burn, tear or dent. *Futurmill, Inc.*

For more data circle No. 38 on postcard, p. 121

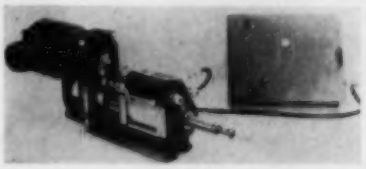
Cutting coolant

A fortified industrial lubricant, Hypercut XX is a water soluble cutting coolant incorporating three additives. They are: a super-lubricant additive to aid lubricity, an anti-foaming agent designed to eliminate bubbling reaction, and a bactericide. The product is recommended for use in the machining of high hardness alloys. *Destiny Products Co.*

For more data circle No. 39 on postcard, p. 121

Reversing control unit

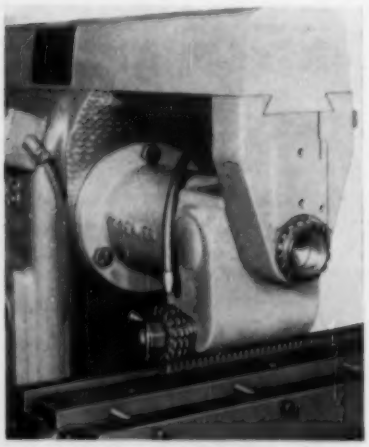
An automatic reversing control unit enables the Model 24 Holomatic unit to operate as a motor reversing type high-production tapping unit or as a production drilling unit. The three-position selector switch on the cover provides the method of selecting the desired type of operation. The tapping capacity of the units is ¾ in. to 16 in. mild steel, and the drilling capacity is ⅝ in. in similar material. Production rates of up to 30 tapped holes per minute are claimed when special high reversal type motors are used for the company's spindle drive. *Hause Engineering.*



For more data circle No. 40 on postcard, p. 121

Rack milling attachment

Rack milling attachment on the Greaves horizontal milling machine makes possible many types of cross milling operations, including rack milling on long workpieces. The new unit consists of a milling head which mounts on the column face of the machine. Driven directly from the machine spindle through spiral bevel gears, the new attachment operates at spindle speeds which are in 1:1 ratio with the machine spindle speeds. *J. A. Fay & Egan Co.*



For more data circle No. 41 on postcard, p. 121

Automatic coreblower

A new, push-button controlled coreblower is designed to bring the advantages of large, high-speed automatic equipment to the smaller shop. Automatically sequenced, this new coreblower can handle all types of core boxes—open-face, horizontally split, or vertically-split.

A removable table clamp is available for horizontally-split boxes and a 2 in. draw cylinder makes easy work of horizontally-split boxes where the upper half of the box is mounted on the blower magazine. *Pettibone Mulliken Corp.*

For more data circle No. 42 on postcard, p. 121

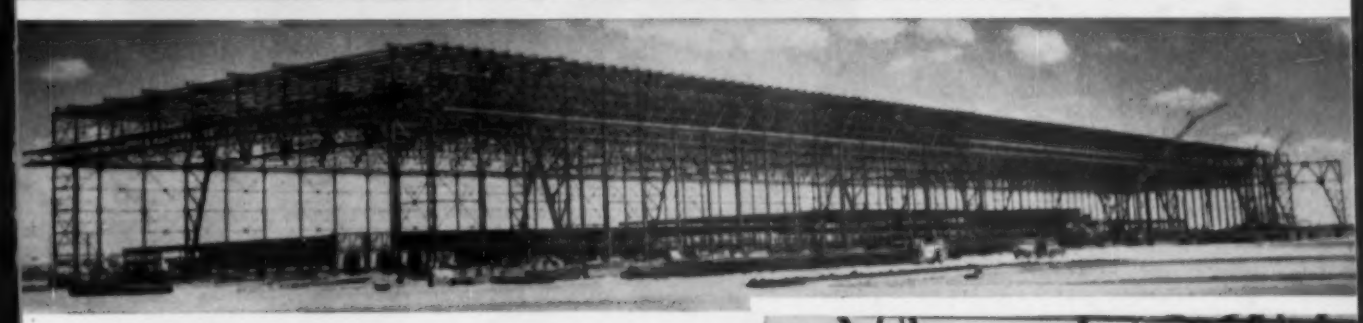
Lubricating unit

A self-propelled, self-powered portable lubricating unit provides power lubrication for industrial plants. The lubricator — powered by a 6 hp, air-cooled engine — has a maximum speed of about four mph suited to normal walking

speed for ease of handling. It has a single stage air compressor to provide ample pressure and its 33 in. turning radius assures easy positioning of the unit between equipment or in tight spots. *Aro Equipment Corp.*

For more data circle No. 43 on postcard, p. 121

New Maintenance Hangar
KELLY AIR FORCE BASE
San Antonio, Texas



Whopping BIG
any way you look at it!

FABRICATED and erected by AMERICAN BRIDGE, the new repair hangar at Kelly Air Force Base, near San Antonio, is the world's largest.

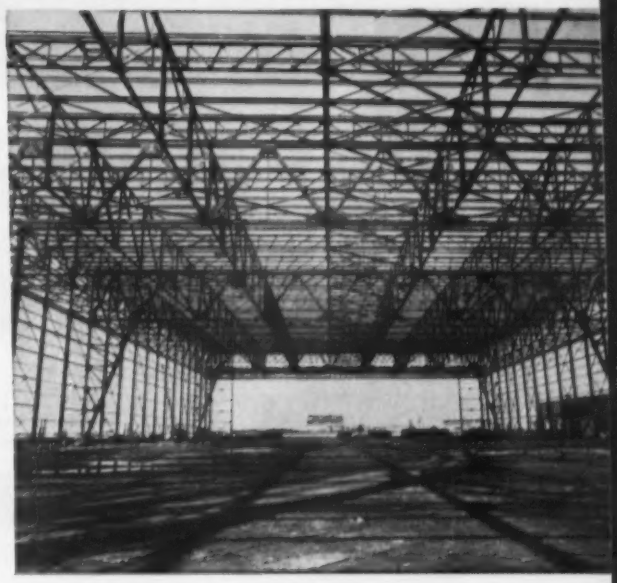
The main repair hangar is 300 ft. wide x 2000 ft. long x 91 ft. high to roof. The framework for this giant consists of 50 double-cantilever trusses 398 ft. long x 24 ft. deep, spaced 36 ft. apart, center-to-center. Each is composed of a center anchor span of 250 ft. and two 74-ft. cantilever spans.

The roof of this main aircraft repair hangar is supported on 10 rigid truss frames 298'-3" long x 24'-9" deep, spaced 250 ft. apart, center-to-center, composed of parallel-chord trusses and two triangular legs which are 66 ft. high x 23 ft. wide at the top. The weight of the structural steel used in this building is 9,374 tons.

The adjoining Maintenance Shops Building is 250 ft. wide x 1650 ft. long. 2,876 tons of steel went into its construction.

In addition to the above main structures, American Bridge fabricated and erected the steelwork for the Boiler House—52 ft. x 80 ft. x two levels of framing; as well as the Pump House—44 ft. x 44 ft.

American Bridge is very proud of its role in helping the United States Air Force expand its air field facilities. Over the years American Bridge has fabricated and erected the steelwork for more than a score of buildings for smaller hangars and other Air Force buildings throughout this country and elsewhere.



Designed by:
The Kuljian Corporation, Architects and Engineers
For Department of The Air Force, Air Materiel Command

General Contractor:
Farnsworth & Chambers Co., Inc.

Steelwork Fabricated and Erected by:
American Bridge Division, United States Steel Corporation

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION • GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.
Contracting Offices in: AMBRIDGE • ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • DENVER • ELMIRA • GARY HOUSTON • LOS ANGELES • MEMPHIS • MINNEAPOLIS • NEW YORK • ORANGE, TEXAS • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ROANOKE • ST. LOUIS • SAN FRANCISCO • TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

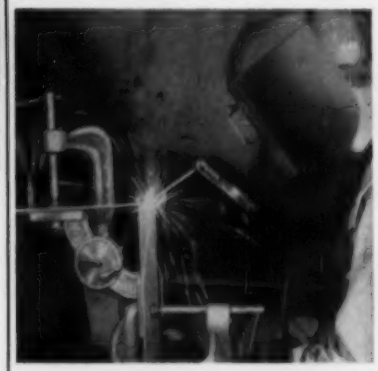
AMERICAN BRIDGE

INTERESTING MOTION PICTURES AVAILABLE—"Building for the Nations" and "The Suspension Bridge," two entertaining and educational films, are now available without charge to business, fraternal, and civic organizations, churches, schools and colleges. Write to Pittsburgh office for bookings.

UNITED STATES STEEL

Adjustable work holder

A new adjustable holder holds two parts at any angle in a vise-like grip. The tool's two clamping faces are adjustable from 0 through 180° and precision machined for perfect alignment. Adjustments are made by loosening the single machine

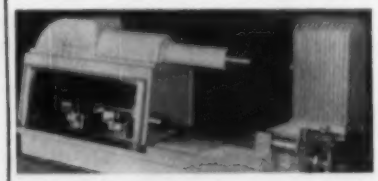


handle and moving the indicator to any desired angle on the dial. The maker states the new tool cuts set-up time, assures accurate angles, increases jig flexibility and adds precision. *Jergens Tool Specialty Co.*

For more data circle No. 44 on postcard, p. 121

Measures gage blocks

Measurement of gage blocks to an accuracy of one-millionth of an inch is possible with a new instrument. This N.P.L.-Hilger Interferometer employs light waves and can accommodate 36 gage blocks at one time in a temperature insulated case. Measurement can be made in a choice of the best radiations from varying light sources with length,



as well as flatness and parallelism of faces, determined. As gages are measured in condition in which they are used, wrung onto a platen, there is no need for special support or compensating calculations. The instrument can handle gage blocks of all common sections and is suited for their production, inspection and calibration. *Engis Equipment Co.*

For more data circle No. 45 on postcard, p. 121

Electronic duplicator

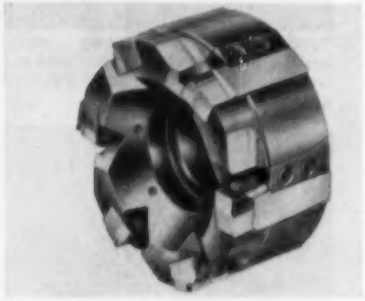
A new single motion type duplicator is designed for use with lathes to 16-in. capacity. Accurate to ±0.0015 in., the unit operates with stylus pressure of 8 oz. so that soft metal templates may be used. The

duplicator may be readily attached to or removed from any lathe and does not interfere with the operation of the lathe when it is used for non-contouring purposes. *Raytheon Mfg. Co.*

For more data circle No. 46 on postcard, p. 121

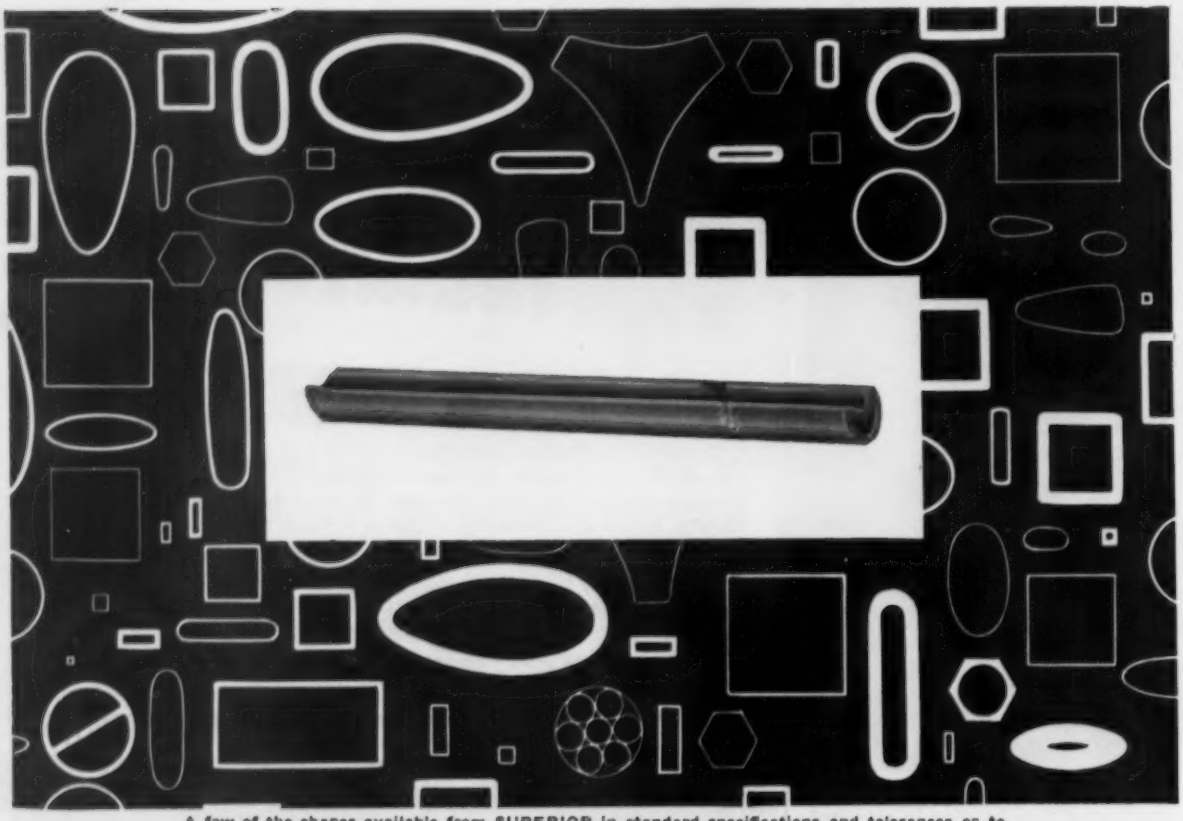
Holds tool bits

A face mill body has built-in adjustments to accommodate standard tool bits with disposable carbide blanks—each blank having six engineered cutting edges which can



be quickly changed. A turn of a socket wrench and a new cutting edge is in place, automatically aligned to run and cut true. *Nelco Tool Co., Inc.*

For more data circle No. 47 on postcard, p. 121



A few of the shapes available from SUPERIOR in standard specifications and tolerances or to your own design. The tube in the foreground is a gun drill shank made from 4130 alloy steel.

Save time and money on special shaped tubing

"SUPERIOR" TUBING IS IMMEDIATELY AVAILABLE IN A WIDE RANGE OF SHAPES, FORMS, ALLOYS

Many manufacturers have discovered that SUPERIOR's ability to supply as standard what many firms consider specialty tubing saves them trouble, time and money. SUPERIOR makes round, square, oval, rectangular, elliptical and flat oval tubing, for instance. It makes capillary tubing, pointer tubing, electronic tubing, telescopic sizes, large OD-light wall tubing. Over 55 analyses are available in carbon, alloy and stainless steels; in nickel and nickel alloys; in beryllium copper, titanium, zirconium.

The gun drill shank shown above and on the right is a good example of SUPERIOR's ability to supply unusual shapes. This newly rediscovered method of producing close-tolerance high-finish holes demands straight, rigid, accurate shanks with a 110° V-groove. SUPERIOR can produce such a shape—and others—in a fraction of the time and cost it would take a customer to form his own.

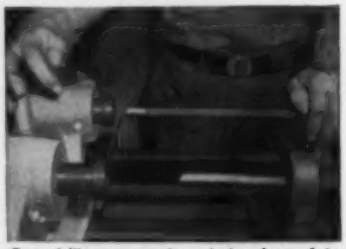
If you're having difficulty getting the kind of tubing you want, SUPERIOR can undoubtedly help you. Write for your free copy of Bulletin 40—*A Guide to the Selection and Application of Superior Tubing*. SUPERIOR TUBE COMPANY, 2004 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif.

All analyses available in .010" to 5/8" OD; certain analyses in light walls up to 2 1/2" OD

Superior Tube

The big name in small tubing

Turks-head rollers converting a round section of SUPERIOR tubing into the typical elliptical shape for a Bourdon gage tube.



Gun drills can produce holes from 4 to 230 diameters or more in 4 times the speed of conventional drilling methods or better. Holes so produced are straight and round to tolerances of 0.0002" or less and wall finishes are 7 mu-in or better.

The Iron Age SUMMARY . . .

Steel expansion program adding to procurement woes . . . Conversion deals are growing . . . Pressure on scrap terrific . . . Steel production record set.

A Delicate Problem . . . The steel expansion program is heaping new burdens on steel supply. Producers are in the delicate position of competing (1) with their customers for available steel, and (2) with each other in the race to expand.

The sad part of it is that steel producers are damned if they do, and damned if they don't. Everybody agrees that more capacity is needed. But a lot of people forget that it takes about 3 million tons of steel to build 10 million tons of new capacity.

Steel producers themselves have been forced into barter deals with their competitors to get special shapes made only by the competitor. And where trades cannot be made, the steel company's contractors stand in line.

Scrap Again . . . Meanwhile, steel scrap trouble may break out at any moment. The pressure for higher scrap prices is terrific. And steel conversion deals constitute the latest fly in the ointment. Some such deals are tied in with scrap. And in such cases the principals involved are inclined to bid up the price.

There's no doubt that conversion arrangements are growing. They would be more numerous and involve heavier tonnages except that most steel producers have a better balance between ingot and finishing capacity than in previous shortage periods. For this reason it's tougher to mesh the many complex details.

Despite the evidence that steel supply will continue tight into third quarter of 1956, there are still some people who feel that things will ease up in first or second quarter of next year.

Outlook Strong . . . These consumers are banking on cutbacks by automotive producers. But the automakers themselves are predicting another good year for sales. So are all of the major consuming industries.

What is being overlooked is that even if one or more of the big consumers run into trouble, there are other factors to bolster demand. These include the need for rebuilding of steel inventories, and the inevitable hedging by most consumers against a possible strike in steel.

Steel production set a new record last week of 2,416,000 tons, equal to an operating rate of 100.1 pct of capacity. This compares with the previous record of 2,413,000 set in the week of Oct. 23 when operations were at 100 pct of capacity. Expected output this week: 100 pct.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,413	Last Week 2,416	Month Ago 3,619	Year Ago 3,619
Ingot Index (1947-1949=100)	150.0	150.4	147.7	121.5
Operating Rates				
Chicago	99.0	98.5	98.5	90.0
Pittsburgh	102.0	103.0	102.0	78.0
Philadelphia	104.0	103.0*	103.0	71.0
Valley	100.0	100.0*	98.0	79.0
West	102.0	101.0	100.0	79.5
Detroit	97.0	95.0	94.0	83.0
Buffalo	105.0	105.0	105.0	97.5
Cleveland	97.0	97.5*	104.0	84.0
Birmingham	94.0	94.0	94.0	64.0
S. Ohio River	92.0	90.0*	92.0	85.0
Wheeling	105.0	105.0*	101.0	96.0
St. Louis	101.0	109.0	106.1	83.0
Northeast	97.0	97.0	72.0	64.0
Aggregate	100.0	100.1	98.5	81.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$47.00	$45.83	$44.50	$32.33
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	22.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.30	15.30	15.30	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	99.125	98.875	96.625	90.625
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

Structural Demand Mounts

Order backlogs run 50 pct ahead of last year . . . New business is up 45 pct . . . Construction industry looks for a record output in '56 . . . New capacity cited as key.

◆ YOU CAN look for a continuing tight market in structurals. It looks like 1956 will be another year of strong demand from the construction industry.

Earle V. Grover, president of the American Institute of Steel Construction, is optimistic about the outlook for supply. But at the same time, he points out that the backlog of orders on fabricators' books will hit around 1.8 million tons by year-end '55. This is 50 pct over last year's level.

New business order bookings, he estimates, will hit 3.4 million tons, nearly 45 pct over the 1954 level.

Mr. Grover is banking on expansion of capacity to help relieve an admittedly tough situation in structurals. He points out that mill expansion programs launched earlier are, in many cases, approaching completion. This needed boost in capacity means a gradual increase in finished steel supplies.

By the middle of next year, Mr. Grover looks for a substantial increase in structural output above what it has ever been in the past.

Not to be overlooked, however, is the fact that in many cases the mills themselves are fighting for the steel they need for expansion. In some cases, they're trading with other producers for the products they themselves don't produce.

Trades involve the full gamut of hard-to-get-hold-of products such as sheet, strip, bars, plate, and all types of structurals. They serve a vital need in fulfilling both short-term and longer-term inadequacies. Such practices will continue so long as these products are in such tight supply.

SHEETS AND STRIP . . . One **Chicago** mill is cutting more customer quotas for the third month of 1st quarter in an attempt to get even on carryovers. In some cases, carryovers run to as much as 120 days on hot-rolled sheet. Cold-rolled sheet is just as tight. Strip is better on delivery, mainly due to conservative bookings by most strip producers. As was the case last year, 2nd quarter bookings depend heavily on how automotive prospects look after January. In **Pittsburgh**, major mills are still running 8 weeks or more behind on 4th quarter delivery promises. Hard-pressed consumers still need the warehouses to fill in gaps on production lines. In the **East** virtually all major producers say demand for hot-rolled, cold-rolled, and galvanized is midway through 1st quarter. Second quarter commitments are still a question mark. **Detroit** mill allotments on cold-rolled sheet have been cut drastically. Carryovers into 1st quarter will amount to about 20 pct of some customers' quotas.

GALVANIZED . . . Some consumers in the **Chicago** area are actually building a little inventory in this product. For one, the grain bin program of the government didn't hit as hard as was expected. Secondly, farm buying normally falls off during this season. Whiile demand continues firm, there isn't the carryover problem found in hot and cold-rolled sheet.

BARS . . . From the **West Coast** comes word that a strike in the gravel industry in southern California is putting a damper on reinforcing bar sales there. Heavy demand from automakers, however, is keeping up at a steady pace. Alloy bars are becoming almost as scarce as carbon bars in **Detroit**. One mill reports that alloys are all sold out for 1st quarter and it expects substantial carryovers into 2nd quarter. With 1st quarter ordering practices already set by major **Pittsburgh** mills, it appears that most customers aren't going to get all the bars they want. In the **East**, one large producer is watching January bar order patterns closely, is trying to estimate what demand is likely to be the remaining two open months of the 1st quarter.

PLATE . . . A steady influx of railroad freight car orders coupled with heavy linepipe demand is keeping **Pittsburgh** mills at least 10 weeks behind on plate deliveries. Despite several already announced cutbacks in plate deliveries, most producers see little chance of improvement before next June. Heavy demand for light gage plate in **Detroit** continues to mount. Mills expect little letup in customer orders until next May at the earliest. Continuing shortage of plate is the biggest product headache in **Chicago**. Railcar producers are the hardest hit customers. Delivery carryovers going into 1st quarter '56 will come to at least 60 days. Hard-pressed consumers are now buying foreign plate in bigger quantities both in the Chicago area and in the Southwest. Most of this comes from Belgium and Germany, though some Japanese plate is reported to be active in this market.

STRUCTURALS . . . Some easing in demand for structurals in the **Pacific Northwest** is reported. Principal reason is that colder weather is slowing down highway and construction work. Wide-flange beams continue to grab the demand spotlight in **Detroit**. Little letup in customer orders is looked for before late May. Cutbacks, delivery slowdowns, and continuing structural shortages in **Pittsburgh** are pushing back construction dates all along the line. Only immediate hope for relieving situation is a substantial boost in mill production facilities. Mill deliveries of standards in **Chicago** are running behind 30 to 60 days in many cases, are expected to get even worse by February and March.

Purchasing Agent's Checklist:

Comparison of Prices

(Effective Nov. 29, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 30 1955	Nov. 23 1955	Nov. 1 1955	Nov. 30 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates wrought iron	10.40	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

	Nov. 30 1955	Nov. 23 1955	Nov. 1 1955	Nov. 30 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese†, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢

‡ 74.76 pct Mn base.

Pig Iron Composite: (per gross ton)				
Pig Iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$48.00	$45.50	$44.50	$32.50
No. 1 steel, Phila. area	48.50	47.50	46.50	32.00
No. 1 steel, Chicago	44.50	44.50	42.50	32.50
No. 1 bundles, Detroit	42.00	40.00	39.00	27.50
Low phos., Youngstown	49.50	49.50	49.00	34.50
No. 1 mach'y cast, Pittsburgh	52.50	52.50	50.50	42.50
No. 1 mach'y cast, Philadel'a	53.50	52.50	48.50	42.00
No. 1 mach'y cast, Chicago	54.50	54.50	52.50	41.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$47.00	$45.83	$44.50	$32.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	43.00	43.00	43.00	30.00
Copper, Lake, Conn.	43.00	43.00	43.00	30.00
Tin, Straits, New York	99.125	98.875	96.625	90.625
Zinc, East St. Louis	13.00	13.00	13.00	11.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	24.46	24.40	24.40	22.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. • Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 168→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A3*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *V1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *V1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. *Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo, *H1*, $68.75; Jackson, *J1, G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	33.00	32.25
Sheets	44.25	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25‡	58.25	44.25	59.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C3*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T3*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J3*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Prices Continue To Rise

Pittsburgh joins upward climb . . . Philadelphia shows new gains . . . All Detroit prices up . . . Scrap traffic heavy in Chicago . . . Composite up to $47.00.

◆ SCRAP prices continue to climb with Pittsburgh finally showing signs of life.

Best steelmaking grades are up $2 in Pittsburgh and $1 in Philadelphia and New York. All Detroit prices jumped. In Chicago openhearth prices are unchanged but scrap is moving in good quantities and strength at the broker buying level points to further increases in mill figures.

Winter and conversion deals are becoming bigger factors. Boston reports a spurt in buying activity due to impending cold weather. In Detroit, a water shipping deadline for a Canadian order was seen spurring activity.

Principals in conversion arrangements are bidding up scrap prices in most areas.

Reflecting Pittsburgh and Eastern strength, THE IRON AGE Composite for No. 1 heavy melting steel scrap rose $1.17 to $47.00.

Pittsburgh . . . Steelmaking grades advanced $2 per ton this week as generally strong market conditions made themselves felt in this area. A flat price of $48 was established on No. 1 heavy melting. Low phos scrap moved up $3 per ton to $53. Latest industrial list in the district went for $54.50-55, fob plant. Conversion and growing strength in nearby districts are factors in the latest upsurge.

Chicago . . . Scrap continued to move in volume last week, though a cold snap at week's end slowed scrap collections. New mill activity was slow in coming, though purchasing in a number of grades is expected during this week and next. While prices held, further advances are expected and are reflected in still advancing broker buying prices. Scattered advances, primarily in electric furnace and railroad grades, indicated the strength of the market. Formerly weak grades, notably No. 2 dealer bundles and turnings, are now tightening. No. 2 heavy melting had already picked up steam as out-of-area mills pulled material away from the Chicago district. This is now happening in No. 2 dealer bundles to some extent.

Philadelphia . . . Additional strength was shown in the market this week as low phos moved up $1, bringing along top steelmaking grades in sympathy. Other advances were made in blast furnace grades, rail crops, and in some segments of the cast market. General feeling of the market is that the top leveling off point in most major grades has not yet been reached.

New York . . . Demand is strong for all grades. Entire list is up $1 per ton on basis of domestic and export business. No. 2 steel moved up in sympathy with No. 2. Turnings and cast are up $1, with cast expected to continue its upward trend.

Detroit . . . Bidding on the December lists reflected a surprising amount of strength in the Detroit market. Prices advanced an average of $2 with some industrial grades going even higher. Market observers believe the higher prices are caused by two factors. First, an attempt is being made to beat a water shipping deadline for a Canadian order. Secondly, there is a possibility that steel conversion deals, tied in with industrial scrap, are increasing in number.

Cleveland . . . Cleveland brokers and dealers are sitting on an atom bomb this week. There is a chance of a spectacular new surge of scrap prices. Detroit automotive lists closed strongly late last week. Cleveland lists, closing this week, may well do the same. Since brokers are disinclined to bid without assurance of a sale, indications are that a major consumer will reenter the local market after a full year's lapse. This will be in addition to the regular requirements of other mills. Although higher broker buying from dealers usually heralds such an increase, dealers in Cleveland and the Valley refuse to sell pending outcome of industrial lists. Lists in Cleveland this week total about 22,000 tons and went for an average $47.50 for November. One Valley mill last week bought some tonnage of No. 2 steel at $41 and No. 2 bundles at $37.

Birmingham . . . The scrap market in this district continues strong with all grades scarce. The largest buyer of openhearth grades continues out of the market and prices locally were unchanged, but an Atlanta mill this week bought No. 2 heavy melting scrap for $41.00, delivered Atlanta. Same mill also bought No. 2 bundles in limited quantities. In the past it has bought some bundles from dealers in the Atlanta area, but has not included them in orders to brokers. There are now three consumers for bundles in the district.

St. Louis . . . With the melt continuing above the 100 pct mark the demand for scrap is still strong, but dealers are not as eager to sell as they have been, since they believe that prices may be even higher than at present. Most railroad items are higher on sales of lists. Weather continues satisfactory for collection of scrap.

Cincinnati . . . Major price upswing of possibly $3 a ton is in offing, depending on prices, which were to be announced this week on largest factory list in area. There is scattering of increased broker buying prices of 50¢ higher on secondary grades and $1 on top grades, but insufficient to set a higher market. There is fair amount of local scrap in town, since most scrap for local mill this month came in on springboard. Steel foundry business continues hot while gray iron lags.

Buffalo . . . No change in local market. Dealers say area's biggest buyer may become active by the first of the month.

Boston . . . Market remains firm here with all cast grades advancing and blast furnace grades registering scattered gains. Action is attributed to pre-winter rush for scrap.

West Coast . . . Things continue to be fairly quiet, although there is some indication of a slightly firmer market situation. Exports in both San Francisco and Los Angeles remain moderate to strong.

Scrap Prices *(Effective Nov. 29, 1955)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$48.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	48.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and ms. turns.	30.00 to 31.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. punch'gs, plate	52.00 to 53.00
Heavy turnings	42.00 to 43.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	59.00 to 60.00
RR. steel wheels	54.00 to 55.00
RR. spring steel	54.00 to 55.00
RR. couplers and knuckles	54.00 to 55.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	43.00 to 44.00

Chicago

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 factory bundles	47.00 to 48.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	35.00 to 35.50
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. forge crops	53.00 to 55.00
Low phos. punch'g plate	51.00 to 52.00
Low phos. 3 ft and under	50.00 to 51.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	59.00 to 60.00
Rerolling rails	69.00 to 70.00
Rails 2 ft and under	64.00 to 65.00
Locomotive tires, cut	53.00 to 54.00
Cut bolsters & side frames	54.00 to 55.00
Angles and splice bars	61.00 to 62.00
RR. steel car axles	61.00 to 62.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast.	54.00 to 55.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	42.00 to 43.00
Cast iron brake shoes	39.00 to 40.00
Cast iron car wheels	48.00 to 49.00
Malleable	58.00 to 59.00
Stove plate	41.00 to 42.00

Philadelphia Area

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	48.00 to 49.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Mixed bor. short turn.	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Shoveling turnings	33.00 to 34.00
Clean cast chem. borings	35.00 to 36.00
Low phos. 5 ft and under	50.00 to 51.00
Low phos. 2 ft and under	51.00 to 52.00
Low phos. punch'gs	51.00 to 52.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	43.00 to 44.00
RR. steel wheels	52.00 to 53.00
RR. spring steel	52.00 to 53.00
Rails 18 in. and under	60.00 to 61.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	48.00 to 49.00
Cast iron car wheels	52.00 to 53.00
Malleable	60.50 to 61.50
Unstripped motor blocks	29.00 to 31.00
No. 1 machinery cast.	53.00 to 54.00

Cleveland

No. 1 hvy. melting	$45.50 to $46.50
No. 2 hvy. melting	39.50 to 40.50
No. 1 bundles	45.50 to 46.50
No. 2 bundles	36.50 to 37.50
No. 1 busheling	45.50 to 46.50
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	28.50 to 29.50
Shoveling turnings	28.50 to 29.50
Cast iron borings	28.50 to 29.50
Cut struct'r'l & plates, 2 ft & under	51.00 to 52.00
Drop forge flashings	44.00 to 45.00
Low phos. punch'gs, plate	46.50 to 47.50
Foundry steel, 2 ft & under	50.00 to 51.00
No. 1 RR. heavy melting	48.50 to 49.50
Rails 2 ft and under	64.00 to 65.00
Rails 18 in. and under	65.00 to 66.00
Railroad grate bars	38.00 to 39.00
Steel axle turnings	31.00 to 32.00
Railroad cast.	51.00 to 52.00
No. 1 machinery cast.	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	54.00 to 55.00

Youngstown

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	41.50 to 42.50
No. 1 bundles	48.00 to 49.00
No. 2 bundles	36.50 to 37.50
Machine shop turn.	27.50 to 28.50
Shoveling turnings	31.50 to 32.50
Cast iron borings	31.50 to 32.50
Low phos. plate	49.00 to 50.00

Buffalo

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 busheling	41.00 to 42.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	46.00 to 47.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	54.00 to 55.00
RR. steel wheels	48.00 to 49.00
RR. spring steel	48.00 to 49.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	33.00 to 34.00
No. 1 bundles, openhearth	41.50 to 42.50
No. 2 bundles	29.00 to 30.00
New busheling	41.50 to 42.50
Drop forge flashings	41.00 to 42.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. punch'gs, plate	41.50 to 42.50
No. 1 cupola cast.	42.00 to 43.00
Heavy breakable cast.	36.00 to 37.00
Stove plate	37.00 to 38.00
Automotive cast.	45.00 to 46.00

St. Louis

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	31.50 to 32.50
Machine shop turn.	27.00 to 28.00
Cast iron borings	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
No. 1 RR. hvy. melting	48.25 to 49.25
Rails, random lengths	55.00 to 56.00
Rails, 18 in. and under	60.00 to 61.00
Locomotive tires uncut	54.50 to 55.50
Angles and splice bars	54.50 to 55.50
Std. steel car axles	51.00 to 52.00
RR. specialties	54.50 to 55.50
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	48.00 to 49.00
Rerolling rails	64.00 to 65.00
Malleable	48.00 to 49.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 33.50
No. 1 bundles	38.00 to 39.00
No. 2 bundles	29.00 to 29.50
No. 1 busheling	37.00 to 38.00
Elec. furnace, 2 ft & under	39.00 to 40.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and short turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Clean cast chem. borings	23.00 to 24.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	34.00 to 35.00
Heavy breakable cast.	36.00 to 37.00
Stove plate	34.00 to 35.00
Unstripped motor blocks	19.00 to 20.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$43.50 to $44.50
No. 2 hvy. melting	38.00 to 39.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Clean cast chem. borings	25.00 to 26.00
No. 1 machinery cast.	41.00 to 42.00
Mixed yard cast.	40.00 to 41.00
Charging box cast.	41.00 to 42.00
Heavy breakable cast.	41.00 to 42.00
Unstripped motor blocks	27.00 to 28.00

Birmingham

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	17.00 to 18.00
Electric furnace bundles	46.00 to 47.00
Bar crops and plate	49.00 to 50.00
Structural and plate, 2 ft	48.00 to 49.00
No. 1 RR. hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	59.00 to 60.00
Angles & splice bars	55.00 to 56.00
Rerolling rails	60.00 to 61.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	44.50 to 45.50
Charging box cast.	30.00 to 31.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	36.00 to 37.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 bundles	42.00 to 43.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	25.00 to 26.00
Low phos. 18 in. & under	52.00 to 53.00
Rails, random lengths	55.00 to 56.00
Rails, 18 in. and under	62.00 to 63.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	42.00 to 43.00
Drop broken cast.	52.00 to 53.00

San Francisco

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	18.00
Cast iron borings	18.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	39.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	34.00
No. 3 bundles	30.00
No. 1 cupola cast.	40.00
Mixed yard cast.	40.00

Hamilton, Ont.

No. 1 hvy. melting	$38.50
No. 2 hvy. melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Bushelings	33.50
Bush., new fact. prep'd	36.50
Bush., new fact. unprep'd	32.50
Machine shop turn.	16.00
Short steel turn.	25.50
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	47.50
Cast scrap	42.00 to 45.00

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Lead Consumption Up

Based on first three quarters, consumption expected to hit 1.17 million tons . . . 7 pct higher than 1954 . . . Scrap lead market continues to grow firmer.

◆ TOTAL lead consumption in the U. S. this year should be about 7 pct above 1954, according to Bureau of Mines estimate based on the first three quarters of this year. This would mean a total of about 1.17 million tons consumed. Consumption for the first three quarters was 869,861 tons against 812,926 tons for the same period last year.

Largest consumers remain battery manufacturers, who accounted for 268,550 tons. First 9 months last year battery use was 250,469 tons. Tetraethyl lead producers used 118,228 tons this year against 123,960 tons last year. Cable makers dropped from 94,565 tons in the first three quarters of 1954 to 86,741 tons in the same period this year. Solder spurted to 66,810 tons from 52,940 tons last year.

Other major users reporting increased consumption are ammunition and bearing makers.

In line with the up-trend in lead use, September consumption of 110,500 tons was the highest since April 1951 and 5 pct above August.

Consumers' stocks of refined lead totaled 72,722 tons on Sept. 30, compared to 78,189 tons a month earlier. Total stocks of all grades at the end of September were 115,104 tons, against 116,683 tons at the end of August.

Demand continues strong, and industry sources report that sales figures would be even higher if producers were not becoming reluctant to take orders for delivery too far in the future. Strengthening European demand has firmed the London market and led some sellers here to talk of a price increase.

Reflecting the strong demand for primary metal, scrap lead market continues to grow firmer. Prices have been rising slightly and dealers report that fair quantities are moving.

COPPER . . . Brass mill fabricators received just under 18,500 tons more refined copper than they processed in October, according to Copper Institute statistics.

Consumption by fabricators during October was 115,453 tons, about 1800 tons over September levels. Receipts of refined copper from primary sources were almost 134,400 tons, leaving stocks of about 18,500 tons for inventory. As a result of this unbalance, fabricators total stocks at the end of October were 353,469 tons. In addition, fabricators' working stocks were slightly smaller at 313,048 tons, nearly doubling visible stocks, a total of 40,421 tons.

Undelivered purchases of refined copper totaled 136,075 tons, bringing total stocks on hand or on order to about 175,500 tons, up about 21,000 tons from September levels.

Fabricators' products sold during October contained 120,606 tons of copper, an increase of about 20,600 tons over September. Unfilled orders on the books at the end of the month stood to take 275,255 tons, an increase of about 21,000 tons above the month before.

Price for primary metal continues unchanged, with large producers still quoting 43.00 cents per lb. Custom smelter sales, however, are reported to be at a minimum of 46.50 cents per lb and more talk of considerably higher prices in the outside market is now being heard.

Custom smelters have again raised scrap buying prices, are now paying 39½ cents per lb for No. 2 copper scrap, with prices on other grades adjusted accordingly. It had been hoped that scrap would stabilize at the 39 cent basis for a while at least, but rises in the London market have made dealers more aggressive in demanding higher prices for their metal.

Meanwhile copper customers are asking more copper than is available for delivery this year. Orders for first quarter shipment have been accepted. While demand is, of course, in large part due to peak manufacturing operations, the desire to build up large inventories at higher prices for tax savings under last-in, first-out (LIFO) accounting procedures continues to be a strong factor in the market. Copper users should not expect curtailment of this LIFO buying to bring any substantial change.

MAGNESIUM . . . Production of magnesium ingot in October rose 6 pct over September output to 6286 tons, the Magnesium Assn. reports. October total was 22 pct above the 5148 tons turned out in October 1954.

Wrought product shipments dipped 22 pct from the September record of 1079 tons to 833 tons for October. But wrought shipments in October were 66 pct above the total for the same month last year.

Magnesium castings shipments continue to rise. For the first nine months of this year shipments were 10,504 tons, 10 pct over the 9515 tons shipped in the same period last year. Permanent mold castings shipments of 2392 tons are up 34 pct and die castings up 22 pct to 2149 tons. Magnesium sand castings shipments of 5962 tons were 6 tons less than during the same period last year.

In September of this year, total castings shipments were up 14 pct to 1239 tons from 1088 tons shipped in August. Sand castings shipments for the month were 644, up 8 pct from August.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Nov. 23	Nov. 24†	Nov. 25	Nov. 26	Nov. 28	Nov. 29
Copper, electro, Conn.	43.00	....	43.00	....	43.00	43.00
Copper, Lake, delivered	43.00	....	43.00	....	43.00	43.00
Tin, Straits, New York	99.25	....	98.875	....	99.125	99.125*
Zinc, East St. Louis	13.00	....	13.00	13.00	13.00	13.00
Lead, St. Louis	15.30	....	15.30	15.30	15.30	15.30

Note: Quotations are going prices **Tentative*
†Holiday

Nonferrous Prices *(Effective Nov. 29, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003	40.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6–8	41.6–43.3	56.6–60.2
12–14	42.3–43.7	57.5–61.8
24–26	45.3–45.7	67.7–72.1
36–38	53.6–54.2	90.5–94.3

Screw Machine Stock—2011-T-3

Size*	¼	⅝–⅞	⅞–1	1¼–1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length* →	72	96	120	144
.019 gage	$1.295	$1.727	$2.160	$2.590
.024 gage	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ½ to ¾ in., 65¢; 1⅛ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ¾ diam, 10,000 lb; ⅞ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.50 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.625; 5/16 to ⅝ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD ⅝ to ⅞ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	63.13	....	63.48
Copper, h-r	58.76	59.11	....
Copper, drawn	....	60.36	....
Low brass	56.55	56.49	....
Yellow brass	52.27	52.21	....
Red brass	58.09	58.03	....
Naval brass	52.83	49.94	48.40
Leaded brass	....	....	48.42
Com. bronze	60.18	60.12	....
Mang. bronze	59.39	53.38	54.94
Phos. bronze	81.00	81.50	....
Muntz metal	53.74	49.55	50.80
Ni silver, 10 pct	66.00	68.33	70.68

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.84
Rod, bar, wire	1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless Tube	122	110	153
Shot, Blocks	....	71	....

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb cont'd Be	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	43.00
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $120
Lead, St. Louis	15.30
Lead, New York	15.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$280 to $285
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$22.20 to $24
Platinum, dollars per troy oz.	$97 to $99
Silver, New York, cents per troy oz.	91.00
Tin, New York	99.125*
Titanium sponge, grade A-1	$3.45
Zinc, East St. Louis	13.00
Zinc, New York	13.50
Zirconium, sponge	$10.00

* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	41.00
No. 120	40.50
No. 122	40.00
80-10-10 ingot	
No. 305	44.75
No. 315	43.00
88-10-2 ingot	
No. 210	56.25
No. 215	52.75
No. 245	47.25
Yellow ingot	
No. 405	32.75
Manganese bronze	
No. 421	36.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	32.00-32.75
0.60 copper max.	31.75-32.50
Piston alloys (No. 122 type)	32.75-33.75
No. 12 alum. (No. 2 grade)	30.00-30.75
108 alloy	30.00-30.50
195 alloy	32.00-32.75
13 alloy (0.60 copper max.)	31.75-32.50
AXS-679	30.00-30.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	31.00-32.00
Grade 2—92-95%	30.00-31.00
Grade 3—90-92%	29.00-30.00
Grade 4—85-90%	28.00-28.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38¼
Yellow brass	28⅞	26⅝
Red brass	34¼	33⅛
Comm. bronze	35⅝	35
Mang. bronze	27	25⅝
Yellow brass rod ends	28⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	41
No. 2 copper wire	39½
Light copper	37¼
*Refinery brass	36

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	41
No. 2 copper wire	39½
Light copper	37¼
No. 1 composition	34
No. 1 comp. turnings	33⅛
Hvy. yellow brass solids	28
Brass pipe	27½
Radiators	26
Aluminum	
Mixed old cast	20 —21
Mixed new clips	21 —22
Mixed turnings, dry	20 —21⅛

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	37½—38
No. 2 heavy copper and wire	36 —36½
Light copper	33½—34
New type shell cuttings	33 —33⅛
Auto radiators (unsweated)	22½—23
No. 1 composition	29½—30
No. 1 composition turnings	27½—28
Unlined red car boxes	23½—24
Cocks and faucets	24 —24½
Clean heavy yellow brass	19½—20
Brass pipe	24½—25
New soft brass clippings	24½—25
No. 1 brass rod turnings	22½—23

Aluminum

Alum. pistons and struts	16½—17
Aluminum crankcases	16⅝—17⅛
1100 (2S) aluminum clippings	19½
Old sheet and utensils	16¾—17⅛
Borings and turnings	11 —11⅛
Industrial castings	16⅝—17⅛
2024 (24s) clippings	18 —18⅛

Zinc

New zinc clippings	8 — 8⅛
Old zinc	5½— 6
Zinc routings	4
Old die cast scrap	3½

Nickel and Monel

Pure nickel clippings	125
Clean nickel turnings	100
Nickel anodes	125
Nickel rod ends	125
New Monel clippings	54½
Clean Monel turnings	44
Old sheet Monel	50
Nickel silver clippings, mixed	23
Nickel silver turnings, mixed	19

Lead

Soft scrap lead	12 —12⅛
Battery plates (dry)	6½— 6⅝
Batteries, acid free	4¼

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	80 —81
No. 1 pewter	63 —64
Auto babbitt	42 —43
Mixed common babbitt	14½
Solder joints	19½—20
Siphon tops	42
Small foundry type	16½
Monotype	15
Lino. and stereotype	14 —14½
Electrotype	12 —12½
Hand picked type shells	10½—11
Lino. and stereo. dross	6
Electro. dross	5

IRON AGE

STEEL PRICES

(Effective Nov. 29, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.00 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.00 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.00 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* 7.00 *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* 7.10 *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M7*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.625 *N4*					
	Indianapolis, Ind.									6.60 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*	6.25 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C3*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C3*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	6.80 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.60 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			4.60 *C16, R3,T2*	6.75 *T2*		4.325 *R3, C16,T2*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Nov. 29, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 19 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			*W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.025 *A5, N4, R3*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1,Y1*	5.325 *I3, U1,Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1,I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1,Y1*	$7.90 *I3, U1,Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*						5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3,N5*	5.325 *R3, N5*	5.85 *R3* 5.85 *N5*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1,P6*	5.325 *J3, U1,P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5, P6*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5,P5*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.825 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.275 *S2*			

IRON AGE

STEEL PRICES

(Effective Nov. 29, 1955)

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.25 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Centreville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.80 *A3*	5.575 *A3*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *C3*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.80 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.45 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5, W6*
	Spring City, Pa.			6.25 *K4*		7.80 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland,Newport,Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W1*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.80 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.80 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A3*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1, Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G3*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W9*				
	Youngstown, Ohio	4.65 *U1, Y1, C10,R3*	4.65 *U1, Y1, R3*	5.90 *Y1, U1*	5.575 *U1, Y1, C10*	7.425 *Y1,C10* 7.665 *P2*	6.80 *U1, Y1*	4.50 *U1, Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.25 *K1*	5.25 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.80 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S3*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.025 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C8*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B3*		7.30 *B3*	7.025 *B3*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,C16, R3*	4.65 *T2,C16, R3*				6.90 *T2*	4.50 *T3,R3*			6.725 *T3*	6.25 *R3, T3*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S3*	4.85 *L3* 4.90 *S3*		6.40 *S3*	6.825 *S3*	6.50 *S3*

Steel Prices *(Effective Nov. 29, 1955)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Lacledo Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		⅜ In.		½ In.		¾ In.		1 In.		1¼-1½ In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	15.50	6.25	16.50	4.25	21.00	7.75	23.50	6.50	24.00	9.50	24.50	10.00	26.00	9.75								
Youngstown *R3*	17.50	6.25	20.50	4.25	23.00	7.75	25.50	9.00	26.00	10.00	26.50	10.50	28.00	10.75								
Fontana *K1*	6.00	+9.25	9.00	+5.25	11.50	+1.75	14.00	+1.00	14.50	+0.00	15.00	0.50	16.50	0.25								
Pittsburgh *J3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	15.50	0.25	16.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Sharon *M3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Fairless *N2*	15.00	0.25	16.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Pittsburgh *N1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Wheatland *W4*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Youngstown *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Lorain *N2*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Youngstown *R3*	22.0	6.25	26.00	10.25	28.00	13.75	28.50	13.00	29.00	14.00	29.50	14.50	30.00	13.75								
Fairless *N2*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Sharon *M3*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Pittsburgh *N1*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Wheatland *W4*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Youngstown *Y1*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	21.0	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Lorain *N2*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

Steel Prices *(Effective Nov. 29, 1955)*

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.725	5.65	5.825				
So. Chicago *R3*				7.90			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		7.90		5.625	
Gary *U1*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.90		5.525	
Johnstown *B3*		5.65					
Joliet *U1*		5.65	5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.40
Pittsburgh *O1*					11.90		12.40
Pittsburgh *P5*							12.40
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.90
Steelton *B3*	4.725		5.825			5.625	
Struthers *Y1*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				7.90			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.40	8.60	
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Manch. Wire Am'td	Manch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	152	162		173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162				7.40	7.80
Atlanta *A8*	154	167		175	180	7.50	8.025
Bartonsville *K2**	154	168		175	181	7.50	8.075
Buffalo *W6*						7.40	7.80
Chicago, Ill. *N4***	152	166		173	179	7.40	8.00
Cleveland *A6*	157					7.40	
Cleveland *A5*						7.40	
Crawfordsville *M4**	154	167		175	175	7.50	8.05
Donora, Pa. *A5*	152	162		173	175	7.40	7.80
Duluth *A5*	152	162		173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162		173	175	7.40	7.80
Galveston *D4*	157						
Houston *S2*	167	170			180	7.65	8.05
Johnstown, Pa. *B3**	152	166			175	7.40	7.80
Joliet, Ill. *A5*	152	162		173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154		175	177	7.50	7.90
Los Angeles *B2**						8.35	8.925
Kansas City *S2*	167	.74		.78	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162				7.40	7.80
Moline, Ill. *R3*		162	162				
Pittsburg, Cal. *C7*	171	185			195	8.35	8.75
Portsmouth *P7*						7.40	
Rankin, Pa. *A5*	152	162			175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*				197	195	8.35	8.75
Sparrows Pt. *B3**	154			175	181	7.50	8.075
Struthers, O. *Y1*						7.40	7.90
Worcester *A5*	158					7.70	
Williamsport, Pa. *S5*			160				

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bristol, Conn., *W12*			10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*		8.95	10.50	12.65	15.35
Cleveland *A5*	7.00	8.95	10.50	12.65	15.35
Detroit *D1*	7.10	9.05	10.60	12.75	
Detroit *D2*	7.10	9.05	10.60		
Harrison, N. J. *C11*			10.80	12.95	15.65
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	
New Haven, Conn. *D1*	7.45	9.25	10.80	12.95	
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.00	8.95	10.50	12.65	15.35
Riverdale, Ill. *A1*	7.10	8.95	10.50	12.65	15.35
Sharon, Pa. *S1*	7.00	8.95	10.50	12.65	15.35
Trenton *R4*					
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50		
Worcester, Mass. *A5*	7.85	9.25	10.80	12.95	15.65
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	
	2½	12	41.57	49.16	40.31	
	3	12	47.99	56.76	46.56	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.17	
National Tube	2	13	30.87	36.51	29.93	
	2½	12	42.57	49.16	40.31	
	3	12	47.99	56.76	46.56	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.17	
Pittsburgh Steel	2	13	30.87	36.51		
	2½	12	41.57	49.16		
	3	12	47.99	56.76		
	3½	11	56.03	66.27		
	4	10	74.41	88.00		

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Baltimore	$.10	7.03	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44-13.96	16.36	16.29-16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.78	8.81-9.36	10.27	7.94-7.96	10.30	7.89	8.13	7.83	9.53	12.15-13.80	13.40-13.45	16.65	16.50
Buffalo	.30	6.80	7.90	9.70	7.15	.....	7.15	7.40	7.10	7.90	.....	13.10	.....	16.15
Chicago	.25	6.80	8.00	8.50	7.06	.....	6.99	7.28	7.08	7.75	13.20	12.85	16.05	15.90
Cincinnati	.25	6.92	8.33	8.90	7.30	.....	7.28	7.75	7.32	8.05	13.44	31.00	16.29	16.14
Cleveland	.30	6.80	8.00	8.85	7.16	.....	7.16	7.61	7.14	7.85	.....	12.91	.....	15.96
Denver		8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.25	6.99	8.28	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston		7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85-9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.05	10.00	11.00	8.35	.....	8.05	8.30	8.05	11.25	.....	14.25	.....	17.85
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.25	6.89	8.18	8.59	7.15	.....	7.08	7.45	7.17	7.94	.....	12.94	.....	15.99
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.46	8.68	9.44	8.07	11.10	7.76	7.99	7.96	9.48	13.63	13.28	16.48	16.33
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.14	8.42	9.35	7.67	.....	7.37	7.74	7.64	8.46	13.36-13.51	13.16	16.36	16.21
Pittsburgh	.25	6.80	8.09	9.20	7.16	9.00	6.99	7.23	7.08	7.85	13.20	12.85	16.05	15.90
Portland		7.80-8.60	8.80-10.15	10.65	8.00	7.95	7.75	7.85-8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.10	9.65	10.15	8.35	.....	8.05	8.25	8.05	11.20*	.....	14.25	.....	17.85
Seattle	.00	8.55	10.40	10.80	8.65	.....	8.20	8.30	8.35	11.70	.....	14.60	.....	17.65
St. Louis	.25	7.09	8.38	9.19	7.35	.....	7.28	7.68	7.37	8.14	13.60	13.14	16.35	16.19
St. Paul	.25	7.46	8.50-9.14	9.16	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

Miscellaneous Prices

(Effective Nov. 29, 1955)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	5	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium	.77
Oil hardened manganese	.43
Special carbon	.39
Extra carbon	.32
Regular carbon	.275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (A3, J2, L6) 10 pct	Plate (A3, J2, L6) 15 pct	Plate (A3, J2, L6) 20 pct	Sheet (I2) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	
	410, 430	25.30	29.10	32.85	

CR Strip (S9) Copper, 10 pct, 2 sides, $8.00; 1 side, 30.00.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	25.75
Detroit, f.o.b.	26.25
New England, del'd	26.05
Seaboard, N. J., f.o.b.	25.50
Philadelphia, f.o.b.	25.00
Swedeland, Pa., f.o.b.	25.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	24.40
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	22.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
3½	30	33.75			
2	24	82.50			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Discounts Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

⅝" or smaller	64	66
⅞" to 1¼" inclusive	63	65
1⅜" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex. regular & hvy.

⅝" or smaller	64	66
¾" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

⅝" and smaller	66	66
¾" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount Bright Treated	Discount H.C. Heat
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34	20
9/16 and ⅝" x 6" and smaller and shorter	31	16
⅝", ¾", 1" x 6" and shorter	8	+11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	48	39
⅝", ¾", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Discount Stove Bolts
Packaged, package list	27	38
Bulk, bulk list		
Quantity		
¼-in. diam. & under, 5/16-in. diam. & larger	25,000-200,000	20	61
	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Discount Hex	Discount Square
Packaged, package list	24	27
Bulk, bulk list		
Quantity		
⅜-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.3
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Nov. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick — *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa., (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	133.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick — *Per net ton*

Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick

Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite — *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	40.00
in sacks	46.00

Dead Burned Dolomite — *Per net ton*

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$15.00
Midwest	15.50
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge, iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	34.50¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	58.75¢
Copper, reduced	58.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.18
Silicon	43.50¢
Solder powder .7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	59.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Nov. 29, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.06% C	36.50	0.50% C	35.25
0.10% C	36.00	1.00% C	34.00
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
5.50-5.00% C, 57-64% Cr, 2.00-4.00% Si ... 25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	28.65
Ton lots	30.55
Less ton lots	32.05

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 43-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ¼ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.70
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 46 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.10
Ton lots packed	14.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$86.00
19 to 21%	3% max.	88.00
21 to 23%	3% max.	90.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 21.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ fob shipping point.

Carload bulk	11.20
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.70
Ton lots, packed	14.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $90.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $87.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.75
Ton lots, packed	9.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

50% Si	11.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
		90% Si	18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo ... $1.38

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00
10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.38

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. ... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... $1.37

bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.34

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots	$1.55

Vanadium oxide, 88-89% V_2O_5 contract basis, per pound contained V_2O_5 ... $1.33

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	5.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained B ... $5.35

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.30
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 79	50¢

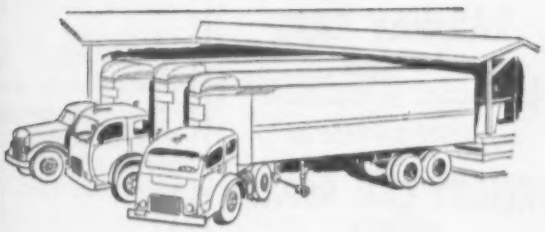
Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 2.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

Silcas, contract basis, delivered.
Ton lots ... 45.00¢

Roy Fruehauf, President, Fruehauf Trailer Company



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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Coast Sales Spurt . . . West Coast used machinery dealers — excluding Seattle—are enjoying a new spurt of business. That's on top of solid sales all year long. They credit activity to recent national machine tool and metal shows—claim the shows jacked up sales.

Metalworking companies here are in a buying mood. They need new machinery for expanding plants. However, firms aren't getting the fast delivery or financing they'd like. Result: they're settling for good used machinery.

The West Coast's continuing industrial boom makes good music in the ears of used machinery dealers. Older, long-established firms are kicking purse strings loose, updating equipment.

Includes Many Markets . . . Looking and buying is widespread. Within a recent week, one Los Angeles dealer, big all year in aircraft industry sales, sold machines to manufacturers of air-conditioning equipment, muffler pipes, house trailers, electrical machinery.

Engine lathes are the hottest machine tool item in Los Angeles. Planers for conversion to skin millers and duplicators are again in demand. "You can't steal them any more," a dealer says. "If you want a used planer, you have to pay a good price. There aren't many around."

Sheet metal equipment is still running hot. The trend is to larger, heavier machines. Demand is up sharply for all types of presses, press brakes, shears. Behind the emphasis on heavier equipment: increasing activity in heavy construction, refinery operations, chemical plants, and truck and trailer body manufacture.

Don't Overlook San Francisco . . . Used machinery business is good in the San Francisco Bay area. It looks as if the year will wind up with a hefty increase over last year. One firm estimates 1955 will show a 50 pct boost over 1954.

One dealer reports good luck with European tools to fill in shortages. Lathes, milling machines, shapers, drill presses and radial drills top the import list. Acceptance is good and foreign merchandise can be offered at about 40 pct under the U. S. equivalent.

Another dealer feels the recent Chicago and Philadelphia shows helped sales. With him, late model horizontal boring mills, milling machines, radial drills and good lathes are moving best. And these same items are in tight supply. Older equipment isn't moving too well, he said.

Seattle Business Spotty . . . In Seattle, several firms report market demand for used machine tools is "somewhat spotty." Explanation: the market shows interest but is taking a "let's wait and see" attitude. Despite this, good used lathes are in short supply, with machine tools such as brakes and shears, and horizontal boring equipment, taking a long time to get to Seattle from the East.

N. Y. Sales Pick Up . . . Dealers in the New York Metropolitan Area estimate 4th quarter business this year anywhere from 30 to 50 pct better than the same period a year ago. New shops coming into operation or those realigning their facilities as a result of departmental or firm mergers, are cited as important factors in the upward business trend.

Despite numerous auction sales held recently, dealers report there's good demand for late-type horizontal boring equipment, radial drills, and heavier weight sheet metal equipment.

Significantly, many customers are buying in lists rather than one item at a time. Brakes and shears are in heavy demand, along with OBI's and wide presses.

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BALERS
#123P-66 Logemann, Charging Box 66x18x24. Produces Bale 125 to 150 lbs.
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8' x 3/16" Bertsch Initial Type
12' x ⅝" Niles Pyramid Type
16' x ⅝" Bertsch Initial Type Bending Roll
18' x ⅝" Wickes Pyramid Type

BRAKES—LEAF TYPE
8' x ⅛" Dreis & Krump Size 186
12' x ⅛" Dreis & Krump
12' x ¼" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity
12' x 5/16" Pacific Hydraulic, 300 ton

BROACH
Model VP-4-40-40 American Vertical Hydr. Broach. Max Capacity 60 ton, Stroke 40", Motor Drive

BULLDOZER
#9 W&W Mechanical Bulldozer, 28" Stroke, Face of Crosshead 24"x29"x108", 50 H.P. A.C. Motor

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5 ton P&H	29' Span 230 Volt D.C.
5 ton Northern	56' Span 230 Volt D.C.
5 ton Northern	57' Span 220/3/60 A.C.
5 ton Cleveland	96' Span 230 Volt D.C.
7½ ton P&H	65' Span 440/3/60 A.C.
10 ton Niles	52' Span 230 Volt D.C.
10 ton Milwaukee With 5 ton Auxiliary	80' Span 230 Volt D.C.
10 ton P&H	96' Span 220 Volt D.C.
15 ton P&H	56' Span 230 Volt D.C.
20 ton P&H	60' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
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1", 4", 5", National High Duty, Air Clutch

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STEAM FORGING—300 lb. to 20,000 lb.
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72" McKay 15 Rolls 4½" Dia.

PRESSES—HYDRAULIC
530 ton Baldwin Southwark, 12" Stroke 48" x 25" Between Columns
800 ton Clearing, 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting, 46" Stroke, Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 36" Stroke Main Ram, 54" x 41" Bet. Columns
2045 ton Birdsboro, 4 Columns, 14" Stroke Platen 42" x 40". Daylite 47"
4500 ton B-L-H Hydr. Forging Press

PRESS—Straight Side
Clearing Model TF41500-200 Triple Acting. Strokes 40, 32, 14", Bed Area 160" x 200"

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BLUEFG 23 Pels Universal Ironworker, Capacity Punch 1¼ thru ⅝", Shear Angles 6x6x⅝"
#1½ Buffalo Universal Ironworker
Style EF Cleveland 36" Throat, Punch 1¼" thru 1"
Style W Cleveland Single End, 60" Throat, 312 Ton

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84" Hilles & Jones, Six Rolls 10" Dia., M.D.
10' Hilles & Jones, Six Rolls 14" Dia.

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13" x 24" Garrison Single Stand Two High
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16" x 24" United Single Stand Two High
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8 Stand Rafter Tube Forming Machine, Spindle 1⅛"

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80" x ¾" Pels

SHEAR—ANGLE
6 x 6 x 1" Long & Allstatter Size B

SHEAR—BAR
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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
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1	2200	G.E.	MCF	600	400/500
2	1500	Whse.	Rev	600	600
1	1400	G.E.	MCF	600	63/190
1	1200	G.E.	MCF	600	750/950
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	250	300/900
2	450	Whse.		550	415
1	350	Whse.		250	340/900
1	250	G.E.	MPC	230	400/600
1	200	Rel.	1970T	230	720
1	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5112	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
6	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	250	360/950
1	120	G.E.	MCP	230	250/1000
1	125	Whse.	SK-161	230	500/1500
1	125	Whse.	SK-182	230	850

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500 25cy	600	11000
1	2000	G.E.	514	600	6600/13200
1	1500	G.E.	720	600	4600/13200
1	1500	C.W.	514	30/115	4000/13000
1	1000	G.E.	720	600	2300/4600
2	750	G.E.	720	275	2300/4600
1	750	C.W.	514	30/115	2300
1	750	Whse.	900	250	2300/4000
1	600	G.E.	720	250	440/2300
1	500	Whse.	900	250	2300/4000
1	300	Whse.	1200	250	208/440/550

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
2	4200	G.E.	FOWT	3	13500x115/200
1	3000	Wagner	HPW-20	3	26400x2400
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	13800x2300

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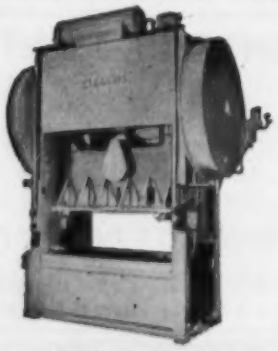

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No. 2F Foster Fastermatic, m.d., Timken
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4	800	Whse.	Encl.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	375/250	250/1000
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
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1	200	Whse.	SK-210	230	400/800
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6 inches	65.50	61.20	54.00	54.00	51.85	48.95
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(Continued on Page 186)

ADVERTISERS IN THIS ISSUE

(Continued from Page 185)

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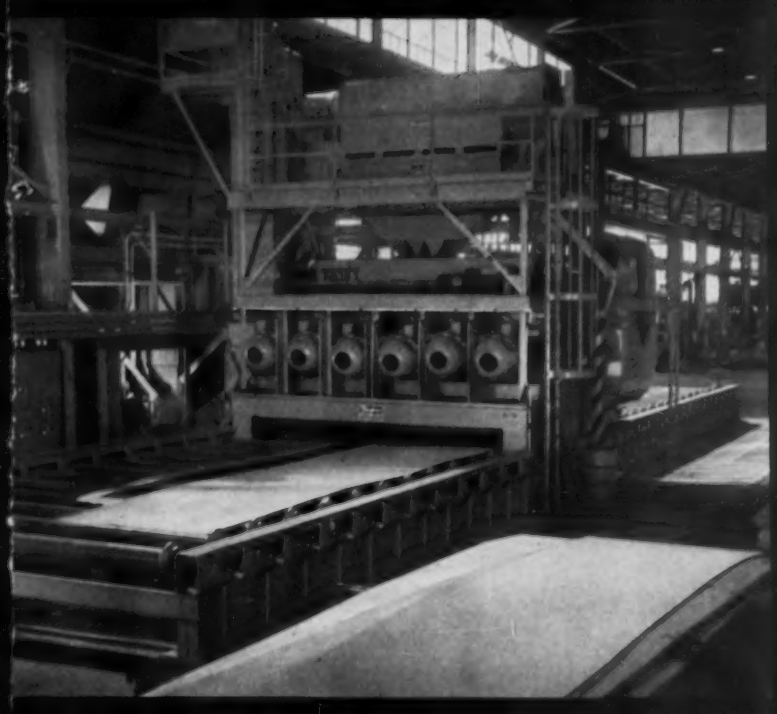

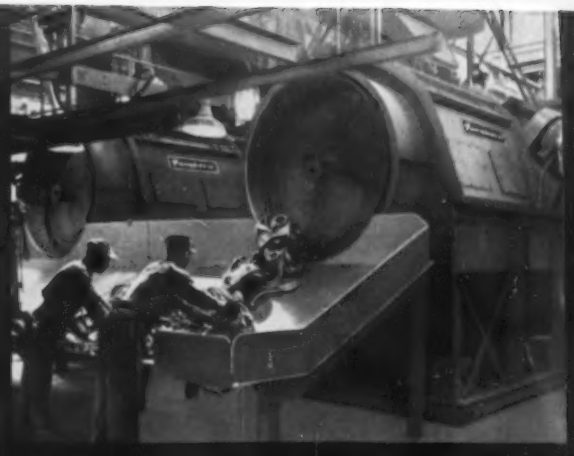

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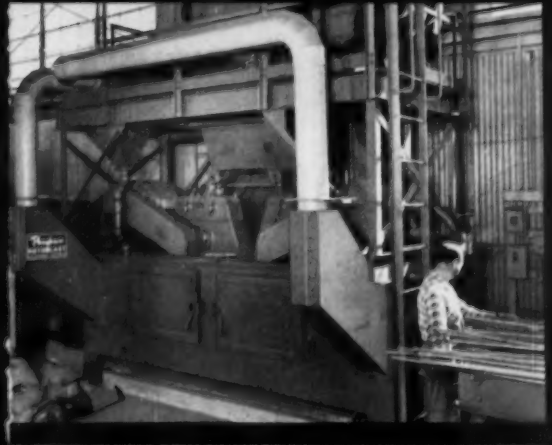

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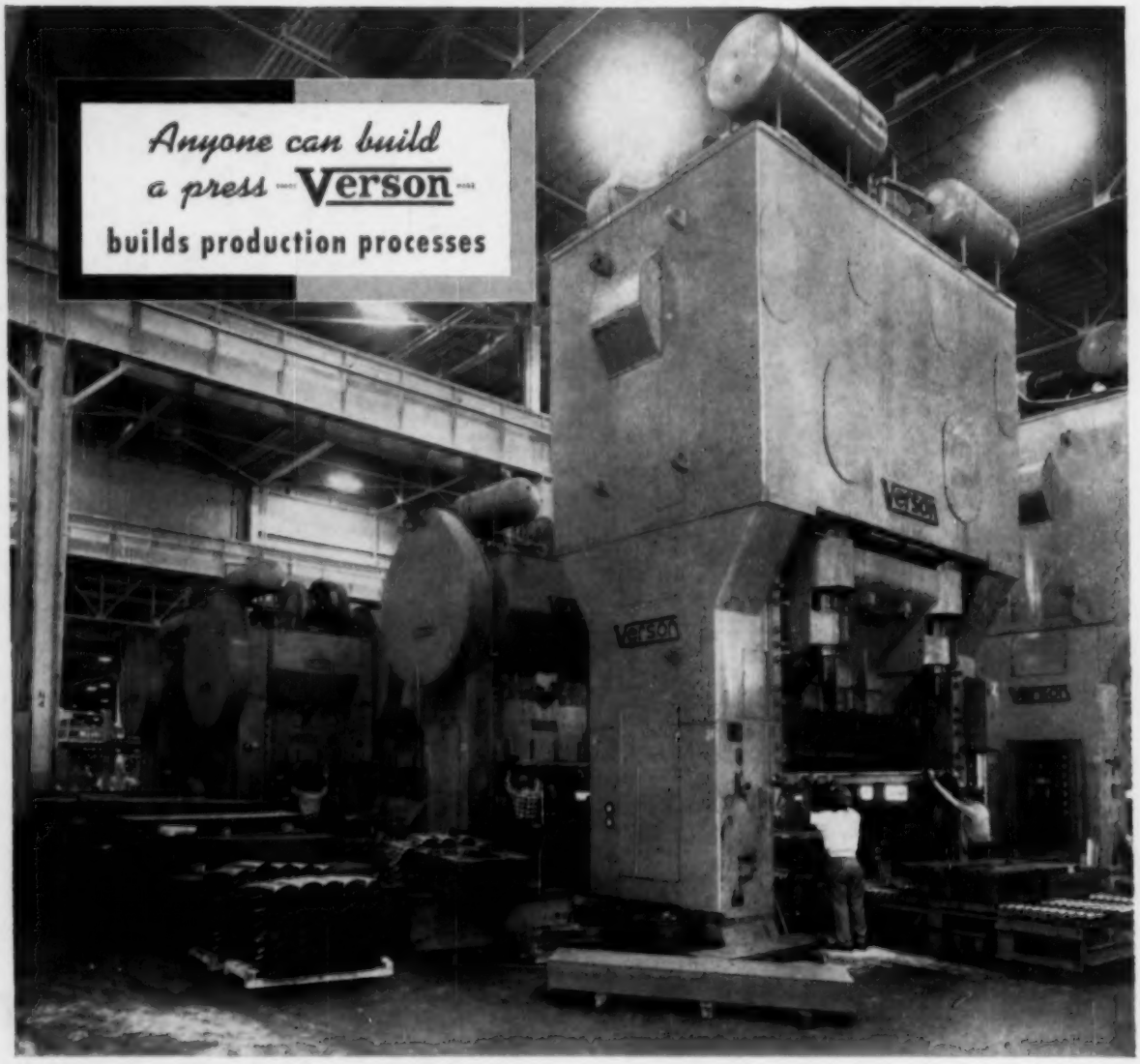

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